GOVERNMENT OF KARNATAKA

VOLUME: IV

PROJECT INFORMATION MEMORANDUM (PIM)

APPOINTMENT OF CONCESSIONAIRE ON TIPPING FEE BASIS TO EXECUTE THE COMPREHENSIVE INTEGRATED SOLID WASTE MANAGEMENT (ISWM) FACILITIES INCLUDING SECONDARY TRANSPORTATION OF MSW FROM TRANSFER STATIONS TO DESIGNATED PROCESSING CENTERS AND FURTHER PROCESSING AND DISPOSAL OF THE SAME

in North Package (Yelahanka Zone, Dasarahalli Zone, East Zone & West Zone) of BBMP and Bengaluru Urban District jurisdiction by seeking private sector participation on Public Private Partnership (*PPP mode – DBFOT Model*)

in South Package (RR Nagar Zone, Mahadevapura Zone, South Zone & Bommanahalli Zone) of BBMP and Bengaluru Urban District jurisdiction by seeking private sector participation on Public Private Partnership (*PPP mode – DBFOT Model*)

BENGALURU SOLID WASTE MANAGEMENT LIMITED (BSWML)

No. 30/1, 1st and 2nd Floor, UNI Buildings, Thimmaiah Road, Vasanth Nagar,

Bengaluru – 560 002.

DISCLAIMER

This Project Information Memorandum (PIM) provides an overview of the existing facilities and the status of Solid Waste Management and handling processes. The information contained herein is based on field surveys and data collected from BBMP/BSWML offices, along with various departmental sources and publicly available reports and surveys.

It is important to note that the PIM is intended to offer a general understanding of the current situation, and the assessment of such facilities shall be an integral part of the Bidder's responsibility. This document is meant to serve as a reference and initial guide for interested parties, and it is recommended that Bidders or Applicants conduct their own due diligence and comprehensive assessments to ensure accurate and up-to-date information before participating in the bidding process.

While every effort has been made to ensure the accuracy and reliability of the information presented, however, BSWML shall not be held responsible for any discrepancies, omissions, or changes that may arise on the publication of this document. **Any reliance on the contents of this PIM is done so at the sole discretion and risk of the reader or user**. This disclaimer underscores the importance of independent verification and assessment when considering participation in projects related to Solid Waste Management and any other associated activities of the bidding process.

Note: This document is a common document for North Package and South Package of the Project "APPOINTMENT OF CONCESSIONAIRE ON TIPPING FEE BASIS TO EXECUTE THE COMPREHENSIVE INTEGRATED SOLID WASTE MANAGEMENT (ISWM) FACILITIES INCLUDING SECONDARY TRANSPORTATION OF MSW FROM TRANSFER STATIONS TO DESIGNATED PROCESSING CENTERS AND FURTHER PROCESSING AND DISPOSAL OF THE SAME". The information provided in this document should be read with reference to the relevant Package—either North Package or South Package—as applicable.

Note: The BBMP shall transition into GBA (Greater Bengaluru Authority) over the next few months, with three constituent municipal bodies, collectively responsible for the current jurisdiction of BBMP.

Executive Summary

1. Introduction:

The **Project** refers to the initiative aimed at enabling the secondary collection and transportation of Municipal Solid Waste (MSW) from transfer stations to designated processing centers. It further involves the processing and scientific disposal of solid waste (SW) in a sanitary landfill. The scope includes the design, development, financing, construction, operation, and maintenance of the plant, all under and in accordance with the terms and provisions of this Agreement.

An **Integrated Solid Waste Management (ISWM) facility** has been conceived to provide a comprehensive solution for Bengaluru City, enabling the processing of solid waste at various locations as per project requirements. ISWM encompasses the processing of solid waste into new or recycled products through technologies such as bio-methanation, Refuse-Derived Fuel (RDF), pelletization, waste-to-energy (for electricity generation), or other similar methods.

All proposed waste processing technologies must be **proven and approved** by relevant authorities, including the Central Pollution Control Board (CPCB), Ministry of Housing and Urban Affairs (MoHUA), Swachh Bharat Mission (SBM 2.0), any State Pollution Control Board (SPCB), or internationally recognized bodies. These technologies must comply with the standards outlined in the background documents, the Solid Waste Management Rules, 2016, National Green Tribunal (NGT) orders, and other applicable laws and regulations. Adherence to any future amendments or orders issued during the concession period is also mandatory.

2. Salient features

The proposed Integrated Solid Waste Management proposal is aimed to cover the entire BBMP jurisdiction plus Bengaluru Urban district area. The BBMP jurisdiction has got 198 wards presently and amended to 225 Wards with 30 divisions under 8 Parliamentary Constitutions.

Project Area	
Total Area (Km^2)	2160 sq. km
Population	
Population within BBMP Limits (Lakhs) – 2023	132
Urban District other than BBMP (Lakhs) – 2023	5.32
Floating Population (Lakhs) – 2023	9.78

Project Area	
Total estimated Population (Lakhs) – 2023	147.1
Total number of Households (lakhs)	32.83
No. of Zones	8
Divisions (Assembly constituency)	30
No. of Wards in BBMP area	225 (198 wards – old)

For futuristic planning, the projected population for the year 2030 has been used to estimate the volume of waste that will be generated, thereby determining the required capacity for effective waste management.

Projected Waste Generated in the Project Area (2030)			
For Year 2030	**Population (Million)**	**Per capita Waste (gm/day/capita)**	**Waste Generated (TPD)**
BBMP	17.2	400	6,872
Urban District	0.7	400	291
Floating	1.3	100	127
Sub-Total	**19.2**	**-**	**7,290**
Street-sweeping	-	-	**870**
Total	-	-	**8,160**

Note: Excludes bulk waste generated

- The average distance from transfer stations to processing & disposal sites is 75 km for North Package and 40 km for South Package.
- Authority will provide approximately 80 acres land for each package to set up the processing & disposal sites, as per Annexure 2 of the PIM.
- The waste quantities, population projections are only indicative to give the fair idea to the bidders. The actual waste quantities, distances to travel and all relevant information has to be established by the bidders on your own and the Authority will not hold the responsibility for the same.
- All intending bidders will be required prepare their own assessment, methodology, technologies and arrive the suitable tipping fee for the entire scope.

3. Package wise details of Secondary transportation and Processing & Disposal work

Based on the 2011 Census and an annual population growth rate of 3.8%, municipal solid waste (MSW) generation in the Project Area is projected to reach approximately 8,160 tonnes per day (TPD) by 2030, comprising 7,290 TPD from households (excluding bulk waste) and 870 TPD from street-sweeping waste, with per capita generation rates of 400 grams for residents and 100 grams for floating populations.

Although operations are expected to begin in 2028, estimates for 2030 have been used to account for full operational capacity. The Project Area includes several existing decentralized and centralized waste processing facilities to which BSWML is contractually committed, amounting to 2,088 TPD of waste (438 TPD to decentralized and 1,650 TPD to centralized facilities). Of this, 438 TPD—planned for decentralized units—will be managed by the Primary Collection & Transport vendors and is therefore excluded from this tender.

This brings the total waste volume for secondary transportation under the Concessionaire's scope to 7,722 TPD. However, of this, 1,650 TPD is allocated to existing centralized facilities (e.g., MSGP and Bidadi KPCL WTE plants) for which the Concessionaire will handle only secondary transportation, reducing the total waste available for processing and disposal under the Concessionaire's scope to 6,072 TPD.

The distribution of the same across the two Packages is as per below:

Planned Capacity	Secondary Transportation (TPD)	Processing & Disposal (TPD)
North Package	3,822	3,073
South Package	3,900	2,999

GLOSSARY

SL. NO.	ABBREVIATIONS	FULL FORM
1.	BBMP	Bruhat Bengaluru Mahanagara Palike
2.	BSWML	Bengaluru Solid Waste Management Limited
3.	CAPEX	Capital Expenditure
4.	C&T	Collection & Transportation
5.	CPCB	Central Pollution Control Board
6.	CERC	Central Electricity Regulatory Commission
7.	CNG	Compressed Natural Gas
8.	CPHEEO	Central Public Health and Environmental Engineering Organization
9.	DPR	Detailed Project Report
10.	DBFOT	Design Build Finance Operate and Transfer
11.	DBO	Design, Build, Operate
12.	DWCC	Dry Waste Collection Centres
13.	EPC	Engineering, Procurement, Construction
14.	GVP	Garbage Vulnerable Point
15.	GHG	GreenHouse Gases
16.	G.o.K	Government of Karnataka
17.	GoI	Government of India
18.	GVW	Gross Vehicle Weight
19.	IEC	Information, Education, and Communication
20.	ISWM	Integrated Solid Waste Management
21.	IT	Income Tax
22.	KCDC	Karnataka Compost Development Corporation
23.	KSERC	Karnataka State Electricity Regulatory Commission
24.	KLD	Kilolitres per Day
25.	LTP	Leachate Treatment Plant
26.	MAT	Minimum Alternate Tax
27.	MRF	Material Recycling Facility
28.	SW	Solid Waste
29.	SWM	Solid Waste Management
30.	MoHUA	Ministry of Housing and Urban Affairs
31.	MTS	Mini Transfer Station
32.	MW	Megawatt
33.	O&M	Operation & Maintenance
34.	OPEX	Operational Expenditure
35.	PIM	Project Information Memorandum

36.	PPP	Public Private Partnership
37.	P&D	Processing & Disposal
38.	PNG	Petroleum and Natural Gas
39.	PMC	Project Management Consultants
40.	RDF	Refuse Derived Fuel
41.	SERC	State Electricity Regulatory Commission
42.	SLF	Sanitary Landfill
43.	SPCB	State Pollution Control Board
44.	SCTPs	Secondary Collection and Transfer Points
45.	SWM	Solid Waste Management
46.	SW	Solid Waste
47.	TEFR	Technical Economical and Financial Report
48.	TPD	Tonnes per Day
49.	ULB	Urban Local Bodies
50.	UDD	Urban Development Department
51.	BUD	Bengaluru Urban District
52.	UN	United Nations
53.	WTE	Waste to Energy
54.	YoY	Year on Year

CONTENTS

1. INTRODUCTION **9**

1.1 Context and background 9

1.2 Overview of project jurisdiction 9

1.3 Bengaluru Urban District 10

1.4 Population growth 12

1.5 Bruhat Bengaluru Mahanagara Palike (BBMP) 12

1.6 Bengaluru Solid Waste Management Limited (BSWML) 13

2. EXISTING SYSTEM OF SOLID WASTE MANAGEMENT IN BENGALURU **14**

2.1 Historical Perspective of SWM In Bengaluru 14

2.2 Overview of Existing System for Municipal Solid Waste Management 14

2.3 Waste Characterization 17

3. DETAILS OF THE PROPOSED PROJECT 24

3.1 Scope of work 24

3.2 Geographical division of packages across Zones/Divisions 31

3.3 Proposed Plan for the Project 36

4. LIST OF ANNEXURES 40

Annexure 1: 40

Annexure 2: Details of proposed sites 60

Annexure 3: Details of existing solid waste management system in Bengaluru 60

1. INTRODUCTION

1.1 Context and background

Waste management is one of the most pressing issues for governmental authorities in India due to rising urbanisation, increase in waste generation and types of waste, lack of space for waste processing facilities, limited financial resources and inadequate waste management systems and infrastructure. In this context, the Solid Waste Management Rules, 2016 ("SWM Rules 2016") were framed by the Ministry of Environment, Forest and Climate Change to address the issue of solid waste management and identify the roles and responsibilities of different stakeholders including government bodies and the waste generators in the solid waste management ecosystem. Under the SWM Rules 2016, the urban local bodies ("ULB") are responsible for implementation of these rules within their jurisdictions.

The rapid increase in waste generation is demanding for a renewed attention to the increasing problem of Solid Waste management. In this context, BBMP will adopt an integrated waste management system that implements a waste management hierarchy with the aim to reduce the amount of waste being disposed of, while maximising recovery of resources and resource conservation. It is closely linked to the 4R approach (reduce, reuse, recycle and recover) and principles of circular economy which also emphasises the importance of waste reduction, reuse, recovery and recycling over other forms of waste processing or management.

Presently, Bengaluru is facing significant problems due to existing disposal practices of generated waste incurring high COST due to lack of proper planned infrastructural facilities; the open dumping in the expanding zone of the city poses severe problems to the structures constructed on these old dumps. In the meantime, groundwater quality deteriorated due to improper leachate management

The Bengaluru Solid Waste Management Limited (BSWML) intends to select a suitable concessionaire for carrying out the work relating to Secondary Collection and Transportation and Processing and Disposal besides establishment of Integrated Processing facilities at various locations to Treat SW in the jurisdiction of BBMP and Bengaluru Urban District in compliance with the Solid Waste Management 2016 rules.

1.2 Overview of project jurisdiction

The proposed study covers the area of Bengaluru Urban District along with the BBMP Jurisdictions.

i. Bengaluru Urban District: The urban district covers about 1450 sq. km with the population of about 5.32 Lakhs (approx.) which covers the 86 villages majorly in five

divisions i.e. Anekal, Yelahanka, Byatarayanapura, Yeshwanthpur, Kengeri and Mahadevapura.

ii. Jurisdiction of the BBMP: The BBMP covers an area of about 714 sq. km with the population of 1.32 Crores (approximately) and floating population of 9.78 Lakhs (based on Dr. Hoysall N Chanakya report on floating population). There are about 225 wards amalgamated into 30 divisions/ Assembly constituencies and these divisions are further amalgamated to 8 Zones (MP Constituencies).

- North Package: comprises of the 4 Zones of BBMP – Yelahanka, Dasarahalli, West, and, East, along with neighboring areas of the Bangalore Urban District;
- South Package: comprises of the 4 Zones of BBMP – Rajarajeshwari Nagar Zone, Mahadevapura Zone, South Zone, and Bommanahalli Zone, along with neighboring areas of the Bangalore Urban District, as detailed in Annexure I of the RFP.

1.3 Bengaluru Urban District

Bengaluru, is the capital city of Karnataka, which is also the Headquarter of the Bengaluru Urban District located on the Deccan plateau at an elevation of approximately 920 meters (3,018 feet) above sea level in the south eastern part of Karnataka. Bengaluru Urban District is spread across 4 Talukas namely Bengaluru North, Bengaluru East, Bengaluru South and Anekal. Bengaluru is renowned and well known as the "Silicon Valley of India" due to its prominent role in the field of information technology and innovations. Bengaluru has a rich history of ancient times and was part of various dynasties, including the Cholas, Hoysalas, and Vijayanagara Empire. The city's modern development, however, gained momentum during the British colonial period. It served as a cantonment area and administrative centre for the British, contributing to its urban growth as well.

The regions exhibit two primary types of soils i.e. red loamy soil and lateritic soil. Red loamy soils are typically found on hilly to undulating slopes in granite and gneissic terrains, predominantly in the eastern and southern parts of Bengaluru. On the other hand, laterite soils are present on undulating terrain, creating a flat to gently sloping topography in the peninsular gneissic region.

The climate in Bengaluru is moderate, with relatively mild temperatures (ranging between 16°C to 32°C) year-round due to its elevation. Summers (March to June) are warm, while monsoons (June to September) bring heavy rainfall. Winters (October to February) are cooler and more comfortable, making it an attractive destination for visitors.

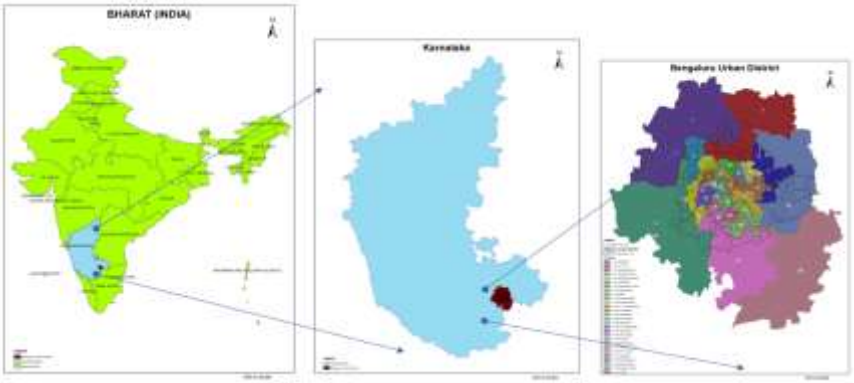
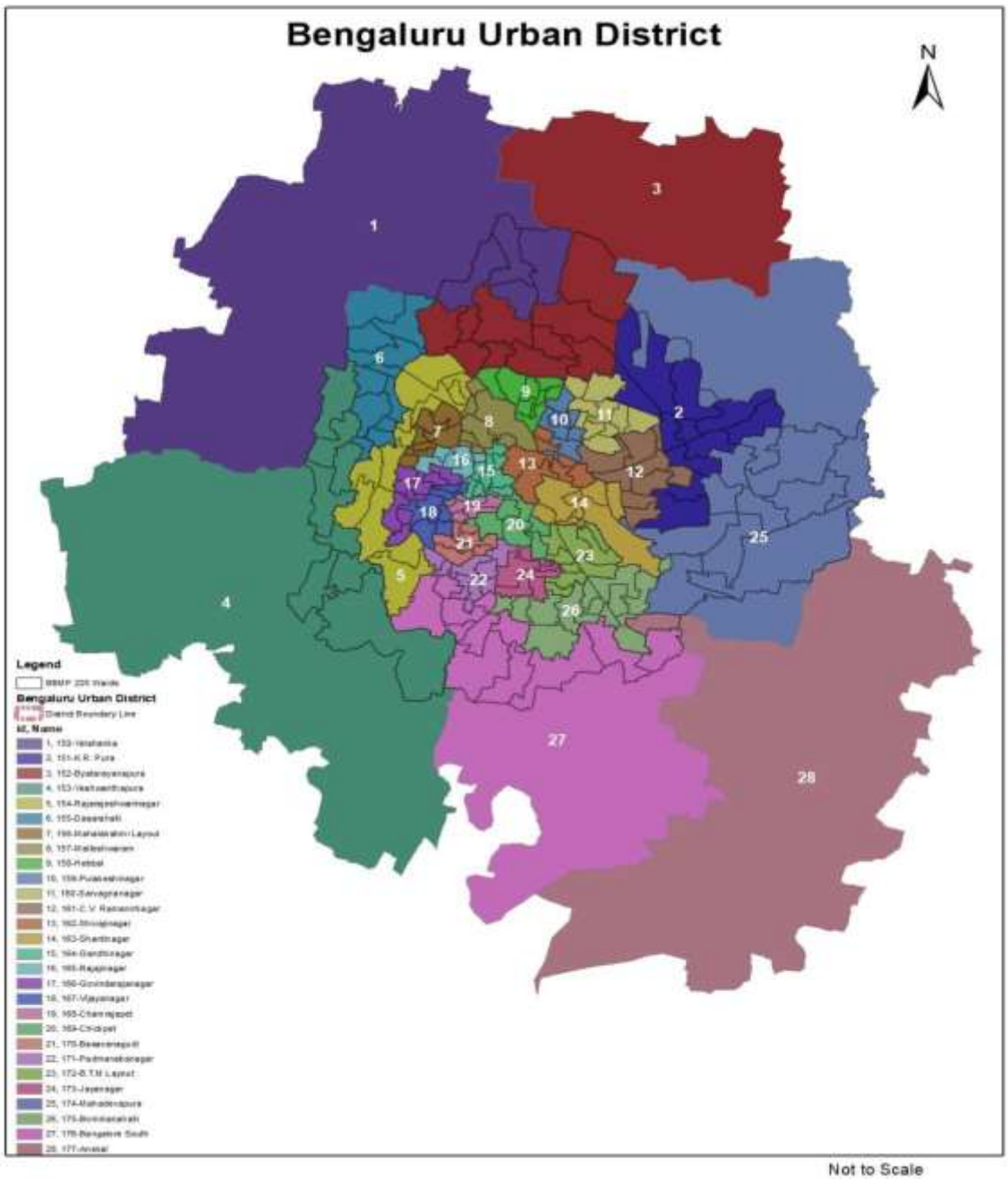


Figure 1: Map of Bengaluru Urban District



1.4 Population growth

Bengaluru underwent swift expansion during the period from 1941 to 1951, becoming the sixth-largest city in India by 1961. Between 1991 and 2001, Bengaluru emerged as the fastest-growing metropolis in India, experiencing a remarkable growth rate of 38% during that decade. In the 2001 census, the city's population was recorded at 56.86 lakh, but the new draft of the City Development Plan by BDA considered the inclusion of population in peripheral villages, estimating the metropolitan area's population to be 61.70 lakh.

The population growth of Bengaluru is evident when comparing census figures from 1981, 1991, 2001, 2011, and beyond, with the city's population standing at 2.92 million, 4.13 million, 5.10 million, and 8.42 million, respectively. Projections suggest that the population of Bengaluru Urban Agglomeration (BUA i.e. BBMP Population and Urban District) is estimated at approximately 13.32 million (excluding Floating Population) and 14.77 Million (including Floating Population) for 2023. A key factor contributing to this substantial growth is the cosmopolitan nature of the city, drawing people from diverse locations, particularly as a prominent IT hub in South India.

With the rapid urbanization, waste generation has surged drastically, placing considerable strain on all civic infrastructure services, including Solid Waste (SWM) management. This Estimated Planned Capacity has been estimated for the year 2030 – the population is estimated to grow at 3.8% with waste per capita considered as 400g per capita for Bengaluru & BUD, and 100g per capita for floating population.

1.5 Bruhat Bengaluru Mahanagara Palike (BBMP)

Bruhat Bengaluru Mahanagara Palike (BBMP) is the Nodal agency for this project and the administrative body responsible for civic amenities and social infrastructural development for the Bengaluru. Also, the Bruhat Bengaluru Mahanagara Palike has a council that consists of 225 elected members of councillors, each representing a ward for public administration. Both the mayor and deputy mayor are chosen from the councillors itself for a period of 1-year term to 5-year term. For a more efficient and effective administration, the Bengaluru City has been divided into 8 different administrative zones/ Sanitary Zones covering 225 administrative or political wards.

Hierarchical Mapping of Bengaluru City

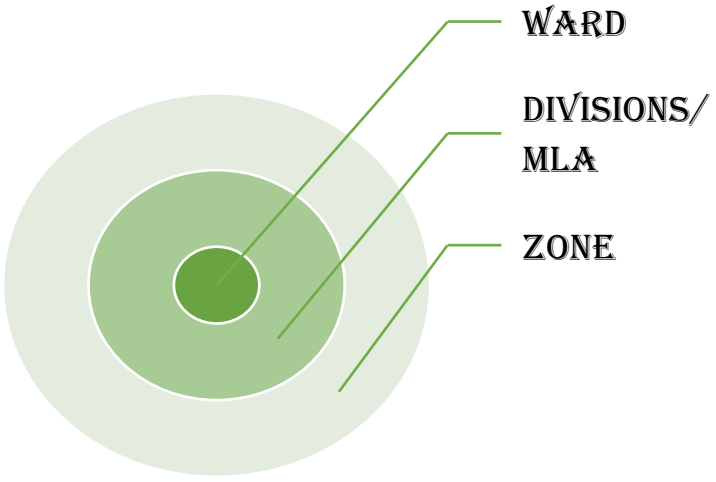


Figure 2: Hierarchical Mapping of Bengaluru City

The most elementary administrative division within Bengaluru city, overseen by the BBMP, is the ward, where councilors are elected. There are 225 wards, each falling within the divisions/MLA constituencies of the Karnataka State Legislative Assembly, totaling 30 such divisions/constituencies. These, in turn, are organized under eight zones to facilitate the efficient and effective management of BBMP's operations.

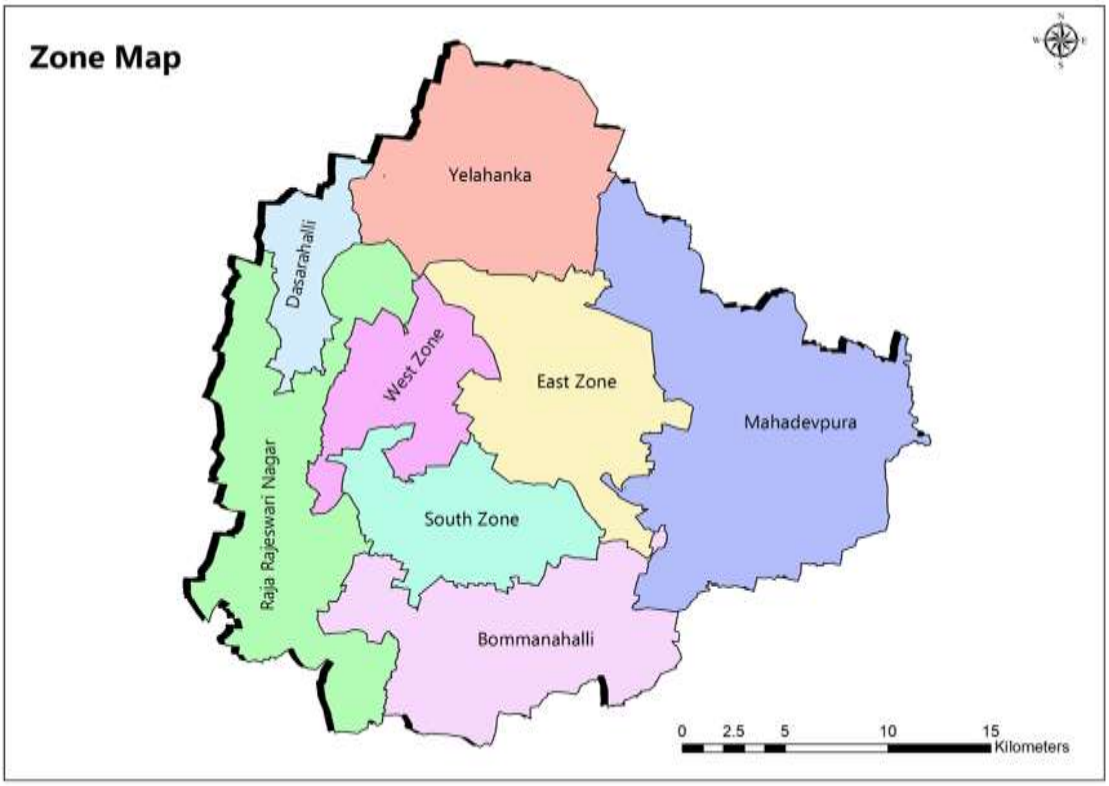


Figure 3: Zone wise map

1.6 Bengaluru Solid Waste Management Limited (BSWML)

Bengaluru Solid Waste Management Limited (BSWML) is a government owned company / exclusive set up made by the Bruhat Bengaluru Mahanagara Palike (BBMP) with independent Board to implement and execute specific solid waste management (SWM) projects to deliver efficient and affordable Integrated Solid Waste Management Project / Infrastructure to the citizens of Bengaluru. Thus, BSWML is the project implementation and monitoring authority for the proposed project.

Bengaluru Solid Waste Management Limited is chaired by Additional Chief Secretary of Government of Karnataka (G.o.K)/ UDD. The Chief Commissioner/BBMP is the Managing Director. The Special Commissioner (BBMP - HQ) is the CEO of the BSWML. There is a Board of Directors constituted as per the rules of the company. The overall technical matters shall be reviewed through the technical committee appointed by the company as per the extent of the rules.

2. EXISTING SYSTEM OF SOLID WASTE MANAGEMENT IN BENGALURU

2.1 Historical Perspective of SWM In Bengaluru

Bengaluru has played a pioneering role in shaping the key milestones of Solid Waste Management (SWM) at the national level. Some noteworthy achievements include:

- The establishment of India's first solid waste processing plant by the Karnataka Compost Development Corporation (KCDC) at Kudlu, Bengaluru in 1975, which remains operational to this day.
- The initiation of the first decentralized community compost unit in Bengaluru by the NGO Waste Wise Trust in 1988.
- The commencement of the first door-to-door collection of segregated waste in Bengaluru by Acts Trust and the Centre for Environment Education in 1990.
- The establishment of the first citizen forum dedicated to addressing SWM, known as the Swabhimana Initiative, for the Bengaluru City Corporation (BCC) in 1998.
- The creation of India's second dry waste collection center in Bengaluru in 2013.
- Bengaluru's recognition as the Best Self Sustainable Mega City in Swachh Sarvekshan 2020.

2.2 Overview of Existing System for Municipal Solid Waste Management

1. Bengaluru Solid Waste Management Limited is headed by the Chairman and Managing Director/Commissioner of BBMP and Director/Additional Commissioner/ Special Commissioner (SWM.)
2. BSWML through BBMP looks after the effective collection, transportation, processing and disposal of solid waste management. The BBMP is carrying out collection, street sweeping, transportation, processing and disposal of Solid Waste from generators. BBMP has a system of door to door collection for collecting the SW. The SW collected has to be processed before land filling. BBMP has taken several steps to streamline the SW management in the city.

Figure: 4: BBMP Existing system

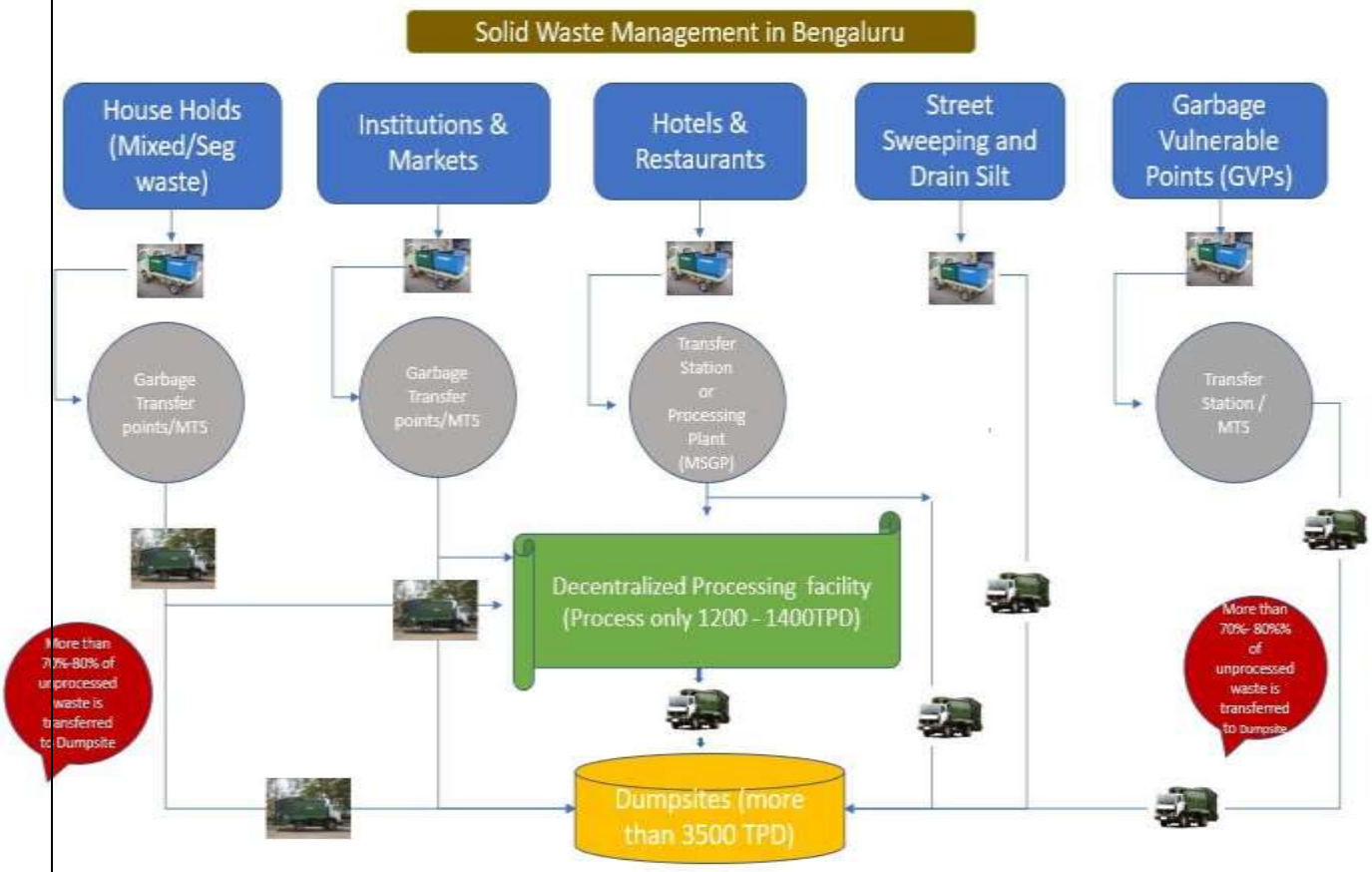

Solid Waste Management in Bengaluru
House Holds (Mixed/Seg waste)
Institutions & Markets
Hotels & Restaurants
Street Sweeping and Drain Silt
Garbage Vulnerable Points (GVPs)
Garbage Transfer points/MTS
Garbage Transfer points/MTS
Transfer Station or Processing Plant (MSGP)
Transfer Station / MTS
Decentralized Processing facility (Process only 1200 - 1400TPD)
More than 70%-80% of unprocessed waste is transferred to Dumpsite
More than 70%- 80%% of unprocessed waste is transferred to Dumpsite
Dumpsites (more than 3500 TPD)

Figure: 5: BBMP Existing system

3. The Waste Generated are collected, recycled/ processed and disposed by Bengaluru Solid Waste Management Limited. This waste includes waste collected from households, commercials, institutions, street sweeping, drain cleaning and bulk waste generators.

4. The solid waste management practices in Bengaluru involve several components, including waste segregation at source level, doorstep collection, transportation, processing, and disposal.
5. IEC activities are being intensified and penalties are being levied for non-compliance. The households are required to segregate their wastes into two categories namely wet and dry waste.

School children learn about the valuable contribution of waste-pickers in reducing the amount garbage in the city,
Source: wakeupcleanup.tumblr.com

Figure 6: Awareness to school children

6. Domestic Hazardous waste from household hazardous waste like discarded medicine, sanitary napkins, diapers, batteries, paints etc is collected separately.
7. Burning of Leaves has been prohibited in the city. Awareness is being created on the same Instructions have also been given for composting of leaf litter in nearby parks and open spaces.
8. Municipal workers and private contractors collect waste from households, commercial establishments, and public places (GVPs- Garbage Vulnerable points). There are different bins for segregated wet (organic) and dry (non-organic) waste in the Auto Tippers. The waste collection is divided into different zones or wards. Segregation at source is encouraged to separate organic waste from dry waste. Residents are encouraged to segregate waste into separate bins, promoting better recycling and processing efficiency. Collected waste is loaded onto waste collection vehicles, including compactors and tippers. These vehicles transport waste to waste processing centres or landfills.

L: Hoarding displayed on important street junctions, R: Poster informing citizens about segregation and collection regime

Figure 7: IEC Material

2.3 Waste Characterization

Information on the nature of wastes, its composition, physical and chemical characteristics and the quantities generated are basic requirements for conceptualizing & designing solid waste management plans. As urbanization has grown, along with shifts in dietary choices and lifestyles, the volume of Municipal Solid Waste has increased substantially, leading to noticeable fluctuations in waste composition. The changes in the composition of SW should form essential criteria for any waste management system. Hence, the data available on the composition of the waste from different sources over the years have been collected and analysed. The constituents of an MSW may be classified as:

Biodegradable: Organic materials, which can be degraded by biological agents, e.g. microbes are known as biodegradable. Examples are food material, fruit and vegetable waste, garden waste (plant waste) etc.

Recyclables: Plastic, metal etc.

Combustibles: Relatively dry material having a high calorific value, such as cardboard, etc. are known as combustibles.

Domestic hazardous waste: means discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired medicines, broken mercury thermometers, used batteries, used needles and syringes and contaminated gauge, etc., generated at the household level.

Inerts: means waste which are not biodegradable, recyclable or combustible street sweeping or dust and silt removed from the surface drains.

Waste Characterization Report is made as a detailed assessment based on the following: -

Waste characterization Report by BBMP

Waste Characterization Report by Sky Group in DPR for GVPs

2.3.1 BBMP Reports

The data presented in was statistically analysed to get the variations of a different type of waste in rapidly growing cities like Bengaluru (figures in percentage).

Year	Biodegradable	Paper/ leather/ cardboard	Rubber/ debris	Glass	Plastic	Metals	Others
2013	61	9	4	1	7	1	16
2017	59	12	5	3	12	1	8

Source: BBMP

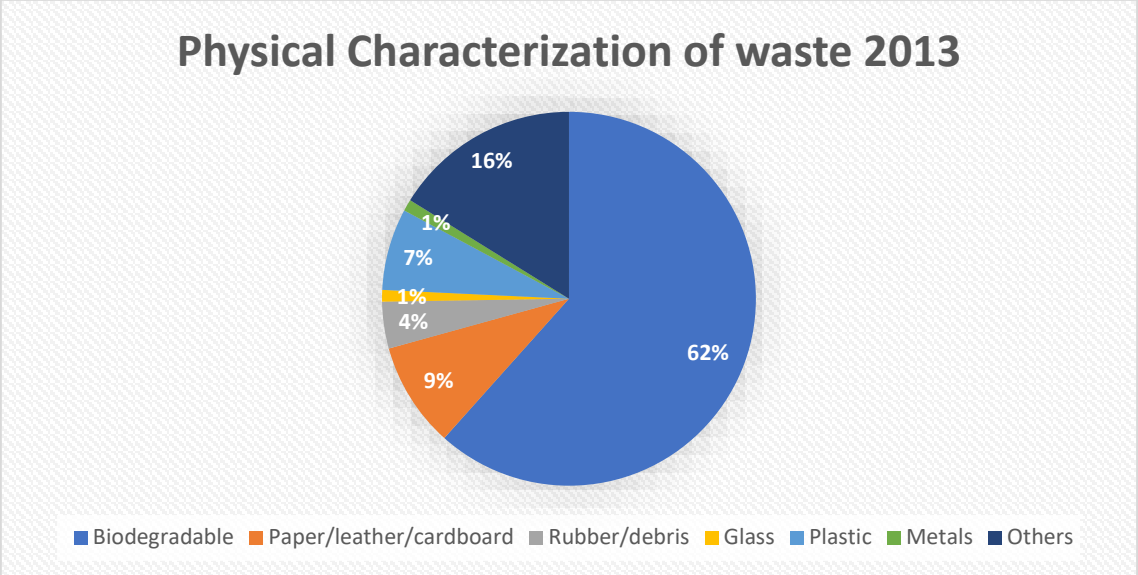


Figure 23: Physical Characterization of waste 2013 (For Reference)

The graph above represents the results of a waste characterization study for the year 2013, sourced from Bruhat Bengaluru Mahanagara Palike (BBMP). This study involves the physical characterization of different types of waste generated during the specified year, categorizing them into various material types. Here's an interpretation of the graph.

1. **Biodegradable**: This category accounts for 61% of the waste generated in 2013. Biodegradable waste typically includes organic materials like food scraps, yard waste, and other items that can decompose naturally.
2. **Paper/Leather/Cardboard**: This category represents 9% of the waste. It includes items such as paper products, leather items, and cardboard packaging.
3. **Rubber/Debris**: This category makes up 4% of the total waste. It may encompass rubber materials and general debris or non-recyclable waste.
4. **Glass**: Only 1% of the waste generated in 2013 falls into the "Glass" category. This typically refers to glass bottles, containers, and other glass-based products.
5. **Plastic**: The "Plastic" category accounts for 7% of the waste. This includes various plastic items like packaging, bottles, and other plastic waste materials.

6. **Metals**: The "Metals" category represents 1% of the total waste and includes metal items such as aluminium cans and other metal-based products.
7. **Others**: This category includes 16% of the waste. "Others" is a broad category that might include miscellaneous items that don't fit neatly into the other categories, like textiles, ceramics, or items made from composite materials.

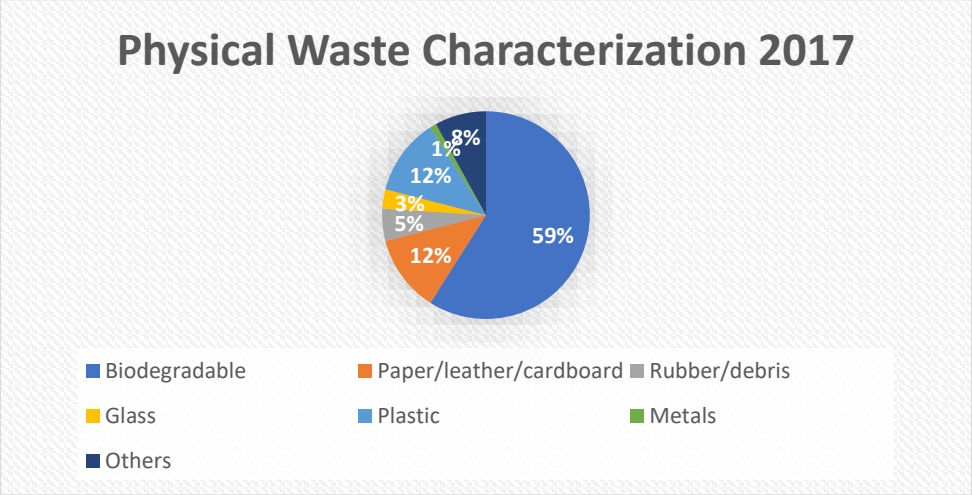


Figure 24: Physical Characterization of waste 2017 (For Reference)

The graph above shows data on waste characterization (Physical Characterization) for the year 2017, sourced from the Bruhat Bengaluru Mahanagara Palike (BBMP). Here's the interpretation of the table:

1. **Biodegradable**: Biodegradable waste accounts for 59% of the total waste generated in 2017. This category typically includes organic materials that can naturally decompose, such as food scraps, yard waste, and other organic matter.
2. **Paper/Leather/Cardboard**: The "Paper/Leather/Cardboard" category represents 12% of the waste. It includes items like paper products, leather items, and cardboard packaging.
3. **Rubber/Debris**: This category makes up 5% of the total waste. It may encompass rubber materials and general debris or non-recyclable waste.
4. **Glass**: Glass waste represents 3% of the total waste generated in 2017. This category includes glass bottles, containers, and other glass-based products.
5. **Plastic:** The "Plastic" category accounts for 12% of the waste. It includes various plastic items like packaging, bottles, and other plastic waste materials.
6. **Metals**: The "Metals" category represents 1% of the total waste and includes metal items such as aluminium cans and other metal-based products.
7. **Others**: This category accounts for 8% of the waste. "Others" is a broad category that might include miscellaneous items that don't fit neatly into the other categories, such as textiles, ceramics, or items made from composite materials.

Further details of the above data can be seen below:

Table 13: Waste Characterization by BBMP (For Reference)

SL. NO.	TYPE OF WASTE	WASTE COMPOSITION (%)
1	Vegetable	30 %
2	Paper	8 %
3	Plastic	12 %
4	Cardboard	4 %
5	Textiles	4 %
6	Grass/ leaves/ wood	6 %
7	Leather	0 %
8	Electronic Item	2 %
9	Metal	1 %
10	Organic	23 %
11	Glass	3 %
12	Debris	5 %
13	Biomedical	2 %
TOTAL		**100%**

Source: BBMP,2017

2.3.2 Survey

A survey was undertaken to assess the physical characteristics of waste over a seven-day period in November 2023. The resultant data has been analysed and presented in the form of a pie chart, aiming to enhance clarity in designing a robust Solid Waste Management structure. This framework is intended to accommodate and process waste efficiently and effectively.

a) Procedure for Waste Characterization

To carry out the waste characterization, Solid waste of 10 kgs was collected from various locations (Garbage transfer points) of the town. The waste collected was then thoroughly mixed and reduced by applying the coning and quartering method (IS: 9235 – 1979). The representative quantity of waste was subjected to physical analysis, determination of moisture and then the sample is processed for further chemical analysis. (IS: 9234 - 1979, IS: 10153 – 1982, IS: 8769 – 1978, IS: 1350 – 1974).

The physical characteristics like moisture content, density, percentage of different components, such as paper, plastic, glass, metal, organic matter, sand, soil, bricks, stones etc. were calculated.

b) Physical Composition of Waste (For Reference)

Table 15: Physical Waste Characterization as per Survey (For Reference)

Physical Waste Characterization as per Survey								
	SURVEY DATES							
Particulars	**22-Nov-23**	**23-Nov-23**	**24-Nov-23**	**25-Nov-23**	**26-Nov-23**	**27-Nov-23**	**28-Nov-23**	**Average**
Vegetable & Food Waste	36.62%	38.31%	36.06%	41.13%	38.87%	41.69%	40.00%	38.95%
Fine organic matters	22.89%	23.94%	22.54%	25.70%	24.30%	26.06%	25.00%	24.35%
Grass	1.95%	2.04%	1.92%	2.19%	2.07%	2.22%	2.13%	2.07%
Leaves	1.95%	2.04%	1.92%	2.19%	2.07%	2.22%	2.13%	2.07%
Wood	1.30%	1.36%	1.28%	1.46%	1.38%	1.48%	1.42%	1.38%
Paper	5.31%	6.37%	6.64%	4.78%	6.11%	5.58%	6.00%	5.83%
Plastic	8.85%	10.62%	11.06%	7.96%	10.18%	9.29%	10.00%	9.71%
Cardboard	1.33%	1.59%	1.66%	1.19%	1.53%	1.39%	1.50%	1.46%
Textile	1.77%	2.12%	2.21%	1.59%	2.04%	1.86%	2.00%	1.94%
Leather	0.09%	0.11%	0.11%	0.08%	0.10%	0.09%	0.10%	0.10%
Metal	0.88%	1.06%	1.11%	0.80%	1.02%	0.93%	1.00%	0.97%
Glass	1.77%	2.12%	2.21%	1.59%	2.04%	1.86%	2.00%	1.94%
Debris	13.00%	5.00%	8.00%	8.00%	6.00%	3.50%	5.00%	6.93%
WEE Item	0.57%	0.86%	0.86%	0.29%	0.57%	0.43%	0.400%	0.57%
Sanitary Waste	1.43%	2.14%	2.14%	0.71%	1.43%	1.07%	1.000%	1.42%

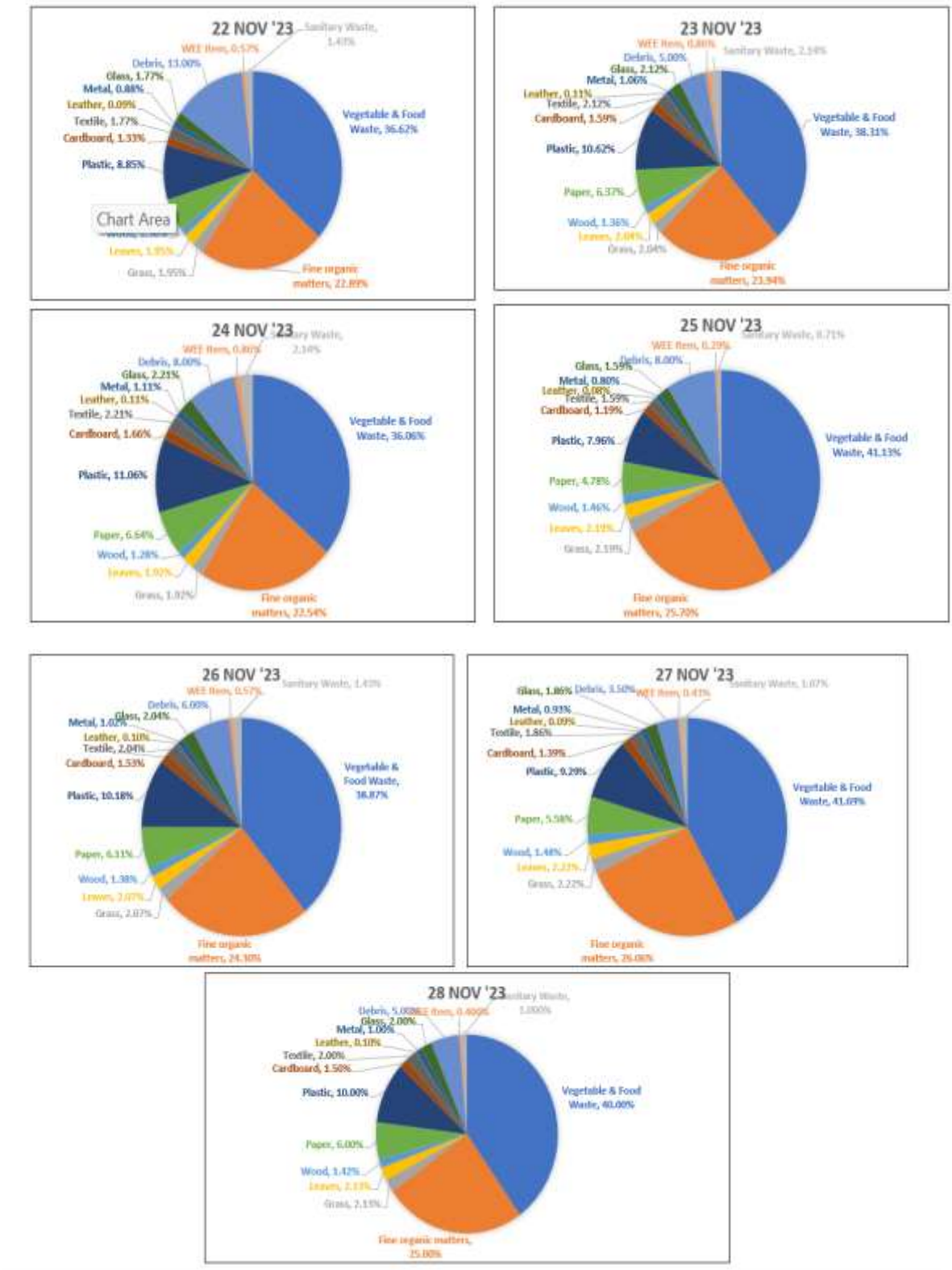


Figure 25: Physical Waste Characterization as per Survey

From the above survey, the Inferences are as follows: -

Item	22-Nov	23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	Average
Organic Waste (Vegetable & Food waste, Grass, leaves, wood, fine organic matters etc.)	65%	68%	64%	73%	69%	74%	71%	69%
Recyclables (Leather, Plastics, Paper, Cardboard, Metals, Glass, etc.)	20%	24%	25%	18%	23%	21%	23%	22%
Inert (from the domestic sweeping and other activities)	13%	5%	8%	8%	6%	4%	5%	7%
Others (WEE Item, Sanitary Waste, etc.)	2%	3%	3%	1%	2%	2%	1%	2%

Table 16: Inferences from survey

NOTE: The reports/ information provided in the PIM to give a fair idea to the intending bidders. However, the intending bidders need to study the city scenario, jurisdictions, waste characterization and assess on their method of arriving at the waste quantity, quality and its physical and chemical compositions to establish the processing facilities as per the SWM rules 2016/ SBM-2.0 or any other statutory rules prevailing in India.

3. DETAILS OF THE PROPOSED PROJECT

3.1 Scope of work

Name of the work: Appointment of Concessionaire on Tipping Fee basis to execute the Comprehensive Integrated Solid Waste Management facilities including Secondary Transportation of MSW from Transfer Stations to designated Processing Center(s) and further Processing and Disposal of the same.

North Package: comprises of the 4 Zones of BBMP – Yelahanka, Dasarahalli, West, and, East, along with neighboring areas of the Bangalore Urban District;

South Package: comprises of the 4 Zones of BBMP – Rajarajeshwari Nagar Zone, Mahadevapura Zone, South Zone, and Bommanahalli Zone, along with neighboring areas of the Bangalore Urban District, as detailed in Annexure I of the RFP.

Introduction

An Integrated Solid Waste Management (ISWM) facility has been conceptualized to offer a comprehensive solution for the processing of solid waste generated in Bengaluru City, at various locations as per project requirements. The ISWM Project involves secondary transportation of municipal waste and further processing solid waste into new or recycled products through methods such as composting, bio-methanation, waste-to-energy from RDF, pelletization, or other proven technologies, in accordance with the standards outlined in the Background Documents, Solid Waste Management Rules 2016, NGT orders, SBM 2.0, and other applicable laws and amendments during the concession period.

The aim is to process all waste generated and generate revenue by applying circular economy principles, thereby reducing the burden on landfills. This shall be achieved through an integrated system of secondary transport, processing and disposal. The entire system shall comply with the Solid Waste Management Rules, 2016 and meet the KPIs outlined in Article 19 of the DCA.

The scope of the Project (the—Scope of the Project) shall mean and include, during the Concession Period, Design, Build, Finance, Operate and Transfer (DBFOT) of facilities and infrastructure for:

a. Transportation of MSW from the Transfer Stations
b. O&M and Maintenance of Transfer Stations
c. Design, Development, Operation, Maintenance, and Management of Integrated Processing Facility for MSW
d. Design, Development, Operation, Maintenance, and Management of Sanitary Landfill for disposal of remnants and residual inert matters from processing of MSW
e. Generation of revenue from sale of reusables and recyclables (if any), sale of by-products or output from processing of MSW (like gas, electricity, etc.), and generation of financial benefits from carbon credits

A. Secondary collection, segregation, and transportation of MSW

The Concessionaire shall be responsible for the following tasks related to Secondary Transportation, starting from at least [90 (ninety)] days prior to COD, or within 90

(ninety) days from the date of handover of the Transfer Station(s) to the Concessioniare in that division.

a. **Transportation of MSW from the Transfer Stations:** The Authority/Authority's agencies will bring in MSW generated in the Project Area and the waste collected from the street sweeping activity to the Transfer Stations. The Concessionaire shall be required to transport the waste from the Transfer Stations, starting from the Date of Commercial Operation (considering Mobilization Period as per the Agreement) or from the handover of the Transfer Station, whichever is later till the expiry of the Concession Period. The same shall be done in an order to ensure the following:

   i. **Transport to Concessionaire's processing facilities:** Concessionaire shall be responsible to conduct Secondary Transportation from the transfer stations to their designated waste processing and disposal site(s) (Note: There are some divisions where Transfer Stations exist and are being operated by another agency contracted by the Authority, wherein the responsibility for Secondary Transport will be handed over to the Concessionaire at the expiry of the existing contracts. More details are given in Annexure 1 of the PIM.)

   ii. **Integration with existing plants for BSWML**: Concessionaire shall be responsible to conduct Secondary Trasport from the notified Transfer Stations to Existing plants where BBMP has existing commitments (Annexure 1 of the PIM for details regarding location, capacity and type of waste required, tagging with transfer stations, duration of commitment)

   iii. **Integration with Dry Waste Collection Centers (DWCCs):** Concessionaire shall be required to collect the dry waste from the DWCCs and perform Secondary Transport from the DWCCs to the designated waste processing and disposal site(s) after extraction of recyclable materials by ragpickers. Refer Annexure 1 of PIM for details regarding DWCCs in the package, location, capacity, assets included, layout, manpower engaged, etc. These will continue to be operated by the ragpickers associations, as per current scenario.

b. **Operation & Maintenance and Management of Transfer Stations:** Some Transfer Stations in this package are currently operational and operated by agencies contracted by the Authority. Refer Annexure xx for details regarding the current operator, assets in place, layout, duration of existing contract and scope of work for each of them. These (and the responsibility for Secondary Transportation under these Transfer Stations) will be handed over to the Concessionaire after a period of 5-7 years, as soon as the current agreement expires. Until such time, the Concessionaire will not be responsible for operation of Transfer Station or to perform Secondary Transport in these respective areas.

   Wherever a Transfer Station doesn't currently exist, Authority shall be responsible to construct and handover Transfer Stations to the Concessionaire at their own cost, including civil structures, machinery, containers, hookloaders, etc. The Authority plans to develop such Transfer Stations in this package within the next 1-2 years. Refer Annexure xx for details regarding location, capacity, details regarding assets and layout of the planned Transfer Stations. Until such time, the Secondary Transportation in that area shall be done by the Authority/contractors of the Authority engaged in Primary C&T. (All the Transfer Stations, existing and new, being handed over shall include hook-loaders and containers provided by the Authority.)

The Authority shall have no obligation to perform any additional capital expenditure towards the Transfer Stations of vehicles over the course of the Concession Period pertaining to the Project Area, and the same shall be in the scope of the Concessionaire.

B. Processing & Disposal of MSW as per SWM Rules

1. **Design, Development, Operation, Maintenance, and Management of Integrated Processing Facility**: It is proposed to develop new facilities for Processing & Treatment of MSW as per MSW Rules and other applicable regulations for MSW processing, resource recovery, treatment, and disposal (P&D) facilities. Concessionaire shall develop the Project Facilities using technology or technologies that it had proposed in its Bid to the RFP, adhering to Solid Waste Management Rules, 2016 and in accordance with terms of this Agreement. Concessionaire shall be responsible for Construction of the Integrated Processing Facility within 24 months from the Execution Date or handover of the site, whichever is later; and operating the same for 30 years post COD.
2. **Design, Development, Operation, Maintenance, and Management of Sanitary Landfill for disposal of remnants and residual inert matters from processing of MSW:** It is proposed to develop new sanitary disposal landfill and a leachate treatment plant (LTP) for management of inerts to be landfilled after processing of MSW. Concessionaire shall be responsible to transport inert and post-processing inert materials from their own processing sites to the landfills. Concessionaire shall be responsible for Construction of the Sanitary Landfill and the Leachate Treatment Plant (as per discretion of the Concessionaire) within 24 months from the Execution Date or handover of the site, whichever is later; and operating the same for 30 years post COD. Furthermore, the Concessionaire shall be responsible for performing post-closure activities as per prevailing guidelines of Central Pollution Control Board, State Pollution Control Board, SWM Rules, etc. over the next 15 years to ensure proper closure of the landfill.
3. The **revenue or income from the sale of segregated useful materials**, including reusable and recyclable materials (if any), compost, soil conditioner, raw RDF, C&D waste, soil, power, electricity, or any other by-products, shall accrue to the Concessionaire. The Concessionaire shall also be responsible to take necessary action to accrue benefits from Carbon Credits, and subsequently share 50% of the benefits accrued from the Carbon Credits of the Project with the Authority.

ii. Bulk Waste management:

a. The management of bulk waste shall not be included within the Concessionaire's scope. However, the Concessionaire shall be empaneled as an Authorized Waste Processor for bulk waste as per existing bylaws of the BBMP and BSWML and encouraged to collect, transport, and process bulk waste at the ISWM facility. The Concessionaire shall be allowed to charge a Service Fee to BWGs, in line with the "Polluter Pays" principle of SWM Rules, 2016. The Concessionaire is to conduct their own analysis and survey of the bulk waste generated to ascertain the processing capacity of the plant(s) required.

b. Since this is a commercial activity conducted on government land, the Concessionaire shall remit INR 800 per TPD of bulk waste handled. This amount shall be escalated by 5% every year in line with the escalation in the tipping fee).

Planned Project Capacity

i. The comprehensive Integrated Solid Waste Management (ISWM) Project is intended to cover the entire jurisdictional area encompassing the full extent of BBMP limits and the Bengaluru Urban District area. This area is distributed across two packages, with the jurisdiction pertaining to North Package detailed more precisely and annexed as Annexure-I of the RFP.

ii. Based on 2011 Census data, waste generation (excluding bulk waste) within the Project Area has been projected for 2030. While the facility is expected to commence operations around the year 2028, the waste generation estimates have been calculated for 2030 in order to account for full operational capacity and long-term planning.

North Package: By 2030, the total municipal solid waste from households and street-sweeping activities—excluding bulk waste—is expected to be 4,047 tonnes of waste per day (TPD). Of this, 976 TPD is already committed to existing facilities for P&D. Once these commitments are accounted for, the Package shall have to deal with 3,822 TPD for Secondary Transportation and 3,073 TPD for Processing and Disposal.

South Package: By 2030, the total municipal solid waste from households and street-sweeping activities—excluding bulk waste—is expected to be 4,113 tonnes of waste per day (TPD). Of this, 1,113 TPD is already committed to existing facilities for P&D. Once these commitments are accounted for, the Package shall have to deal with 3,900 TPD for Secondary Transportation and 2,999 TPD for Processing and Disposal.

iii. The proposed planned capacity has been assessed and planned to meet the projected demand of Year 2030. Due to variations on a daily basis, the Concessionaire must accept maximum up to 125% of the Planned Capacity on any given day.

iv. The Authority shall provide a Minimum Waste Guarantee, i..e, minimum amount of waste that shall be delivered to the Transfer Stations (excluding the amount committed to existing plants) equal to 50% of the Planned P&D Capacity in the first 5 years after COD, and equal to 70% of the Planned P&D Capacity thereafter. This shall include the waste from Bulk Waste Generators, if any, accepted for processing by the Concessionaire.

Planned Capacity	Secondary Transportation (TPD)	Processing & Disposal (TPD)
North Package	3,822	3,073
South Package	3,900	2,999

Detailed Scope of Work:

A. Scope of work for Secondary Transportation:

a. The average trip distance considered for secondary transportation—from the Transfer Station to the entry point of the processing plant up to the weighbridge—is estimated at 75.00 kilometers for **North Package** and 40.00 km for **South Package**. However, this distance may vary depending on the final locations of the Transfer Stations and the processing facility. In cases where the actual average trip distance varies by more than 10% from the estimated average, the additional lead distance for secondary transportation shall be considered for reimbursement, subject to the prior approval of the Authority. The final average trip distance shall be established based on the confirmed location of the weighbridge at the processing plant.

b. Secondary transportation shall be executed using large-sized static compactors capable of compressing municipal solid waste. Leachate generated during the compaction process shall be collected through designated leachate collection pits. The compacted waste shall be stored in containers provided by the static compactors and transported using hook loaders.

c. The Concessionaire shall submit a comprehensive plan and route map detailing the methodology for the secondary transportation of Municipal Solid Waste (MSW).

d. The jurisdictional area under the scope of this North Package comprises sixteen (16) divisions and under South Package comprises 14 (fourteen) divisions. Each division shall be provided with a Transfer Station, to be developed by BSWML and subsequently handed over to the respective Concessionaire for that jurisdiction. a Project level, three (3) transfer stations are currently under AMC contracts with a tenure of seven years. Upon termination of these contracts and based on mutual consent between the Authority and the Concessionaire, these transfer stations shall be handed over on an as-is basis, along with the Secondary Transportation (C&T) scope under the corresponding ISWM package. Four (4) new transfer stations, currently under construction, shall be handed over to the Concessionaire along with the Secondary Transportation scope of the respective ISWM package. The additional transfer stations required under the respective package shall be developed by the Authority at its own cost and handed over to the Concessionaire in a phased manner, along with the corresponding Secondary Transportation responsibilities. The same shall be completed within the first 2 years from the Execution Date. Package-wise details of the Transfer Stations are provided in Annexure 1 of PIM.

e. The operation and maintenance of Transfer Stations handed over to the Concessionaire shall be the sole responsibility of the Concessionaire throughout the Concession Period.

f. MSW operations are essential in nature and should have a continuity without any interrupt. The Concessionaire should work out a detailed plan with the Authority. The detailed transition plan shall be submitted by the Concessionaire within 90 days of appointment date and approved by the Authority and the same shall be implemented. While implementing the transition plan there should be a smooth and seamless handing over and taking over of the operations and public should not get any inconvenience of disruption of service.

g. The Concessionaire shall be responsible for identifying suitable land parcels and establishing the required infrastructure, including vehicle parking yards, workshops, canteens, and administrative buildings, in accordance with operational and regulatory requirements. These facilities are to be developed in each Zone at the Concessionaire's own cost and maintained in compliance with prevailing statutory and safety norms. The Concessionaire shall indemnify the Client against any liabilities arising from fire, health, or environmental hazards at these locations.

h. The commencement of Secondary Transportation activities shall be undertaken by the Concessionaire in a phased manner, subject to the completion or termination of contracts that may be active within each respective Zone.

i. The Concessionaire shall initiate the operation and maintenance of Transfer Stations, including storage, handling of waste, and transportation of Refuse-Derived Fuel (RDF) from designated Dry Waste Collection Centers (DWCCs) (as per Annexure 1 of PIM) to the Project facilities or to the existing commitment plants (as per Annexure 1 of PIM), immediately upon execution of the Concession Agreement. Delays in commencement of any activity under the agreed scope of work shall attract penalties in accordance with the Key Performance Indicators (KPIs) specified under Article 19 of the Concession Agreement.

Compliance

j. Each vehicle must display the designated route map and be integrated with the Integrated Command and Control Centre (ICCC) of the Authority via the Concessionaire's own software. The Concessionaire shall be responsible for completing all necessary activities, including obtaining statutory clearances related to land development, and mobilization/procurement of equipment, vehicles, machinery, and other resources essential for the transportation of MSW from the BBMP jurisdiction and Bengaluru Urban District areas, as specified for Package-1 in Annexure-1 of the RFP document.

k. The Concessionaire shall provide real-time data feeds and monitoring capabilities to BSWML to ensure continuous oversight of vehicle movements and operational transparency throughout the concession period.

l. A Vehicle Tracking and Management System (VTMS) shall be mandatorily installed on all vehicles, containers, and weighbridges used for MSW transportation and post-processing reject disposal. The VTMS shall be a web-based application with real-time GPS tracking, GIS integration, and client-side connectivity at all key locations, including the weighbridge.

m. The Concessionaire shall supply all necessary hardware and infrastructure, including personal computers/laptops, printers, GPS devices, network links, SIM cards/dongles, and antivirus software. VTMS data shall be integrated with BSWML's municipal server via the IT Department, and training shall be provided to municipal and Authority staff. Vehicles shall be equipped with loading/unloading switches. Availability of VTMS data shall be a mandatory requirement for tipping fee disbursement.

n. All vehicles must be fully connected to the BSWML server through VTMS to enable uninterrupted tracking and monitoring. Each vehicle shall also be fitted with a GPS device that remains operational at all times, with the live feed integrated into

BSWML's monitoring platform and website.

o. All vehicles deployed shall comply with prevailing emission norms, and valid Fitness Certificates (FCs) must be obtained from the RTO as per statutory requirements.

p. Noise and air pollution levels shall be monitored in line with norms prescribed by the RTO and Karnataka State Pollution Control Board (KSPCB). Relevant certificates shall be obtained periodically and prominently displayed on each vehicle.

B. **Scope of work for Processing and Disposal:**

a. The Estimated waste quantum of the package has been arrived as 3,073 TPD for **North Package** and 2,999 for **South Package** towards Processing & Disposal which excludes bulk waste to be transported as well as discounts the Waste to be supplied to the existing commitments of corresponding package.

b. The Concessionaire shall prepare a comprehensive proposal for processing the total estimated waste, and undertake the design, development, operation, and maintenance of new integrated Solid Waste (SW) Processing, Resource Recovery, Treatment, and Disposal (P&D) facilities. The proposal shall incorporate appropriate technologies for processing the waste received at the plant. The technologies proposed must be in line with those approved under SWM Rules, 2016 (or any amendments thereof), or any other technologies approved by the CPCB, State PCB, or other relevant statutory bodies in India or abroad.

c. The Concessionaire shall undertake the planning, engineering, designing, construction, operation, and maintenance of MSW Processing, Resource Recovery, Treatment, and Disposal (P&D) facilities, including a scientifically engineered sanitary landfill, Leachate Treatment Plant (LTP), and all auxiliary infrastructure such as stormwater drainage, internal roads, weighbridges, vehicle parking yards, workshops, canteens, administration buildings, laboratories, and other appurtenant structures as per operational and regulatory requirements.

d. The Concessionaire shall establish the required number of processing/ resource recovery projects, which may include waste-to-energy projects, bio-methanation, composting, compressed bio-gas (CBG) projects, MRF facilities, or any other suitable and sustainable technologies. These technologies must conform to SWM Rules, 2016 (or any amendments thereof), or be approved by the CPCB, State PCB, or other statutory bodies, and shall be implemented either at locations indicated by the Authority or at alternative sites approved by the Authority.

e. The Concessionaire shall install weighbridges at both the entry and exit points of the processing plant. Both weighbridges shall be synchronized with GPS and RFID mechanisms, at locations and configurations as deemed appropriate and mutually agreed upon with the Authority.

f. The Concessionaire shall also develop waste management facilities for the treatment and disposal of dead animals, sanitary waste, and any other waste types as authorized by the Authority as per the SWM Rules of 2016.

g. The successful Bidder is at liberty to choose the Proven and demonstrated technology in the beginning and during the course of the project. Any advanced technology which can improve the performance shall be permitted unconditionally. The technologies may be Compost / RDF / Waste to Energy / Bio Methanation / Dry Methanation / Pyrolysis / Plasma or any other technology which is proved and can

be implemented to improve the processing and disposal is within the scope of the Concessionaire but should meet the SWM Rules, 2016 & SBM 2.0 guidelines.

h. Authority desires that its Solid Waste Management system shall be a 'model system' for the Country, which would scientifically collect waste from waste generator and bulk generators, transport, process and dispose of Municipal Solid Waste to have maximum recycling and recovery, Without prejudice to the generality of the foregoing, Concessionaire shall have the right to develop the Project Facilities using such technology that it considers suitable and commercially viable for the purposes of implementing the Project, in accordance with terms of this Agreement and Applicable Law. It is acknowledged that it is the intention of Concessionaire to use the technology associated with the concept of an integrated waste processing plant, the specifications of which are given in schedule 23, and that Concessionaire shall have the right to modify, adapt, upgrade or change the technology, from time to time, based on actual operations of the Plant and requirements of the Project.

i. The revenue or the income from the sale of the segregated useful material such as reusables and recyclables, compost, soil conditioner, user charges from bulk waste generators, raw RDF, C&D, Soil, sale of power, electricity or any other by-product materials shall be in the scope of the Concessionaire and Concessionaire shall take such additional revenue into account while estimating the tipping fee sought.

C. Items excluded from Scope of work

The following nature of scope is not considered as the part of Concessionaire's scope of work under this Agreement:

a. Receive, manage, process or dispose Bulk Waste Generated
b. Receive, manage, process or dispose Biomedical Waste Management
c. Receive, manage, process or dispose Industrial Waste Management
d. Sweeping of streets (Manual and/or Mechanical)
e. Drain cleaning / Silt clearing
f. Maintenance / cleaning of parks
g. Maintenance of public places / toilets
h. Removing and Transportation of carcasses (dead animals)
i. Management of Domestic Hazardous Waste: Hazardous waste such as physical, chemical, biological, reactive, toxic, flammable, explosive, or corrosive waste, if found, during excavation, sorting or segregation shall be stored in a separate area for inspection by authorities of the Municipal Corporation, which will arrange to shift, transport, and dispose by authority as per the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.

3.2 Geographical division of packages across Zones/Divisions

1. The distribution of the wards and population in each package is as follows:

Package-1: North: Yelahanka zone, Dasarahalli Zone, East Zone and West Zone

Table 18 (a): The distribution of Ward and Population in North Package.

Zone	Division	Sub-Division	Population 2023
Yelahanka Zone	Yelahanka	Yelahanka BBMP	134789
		Yelahanka Bangalore Urban District (Chikballapur)	103648
		Yelahanka Sattelite Town BBMP	133518
	Byatarayanapura	Byatarayanapura BBMP	123612
		Byatarayanapura Bangalore Urban District (Bangalore North)	64128
		Kodigehalli BBMP	115386
		Vidyaranyapura BBMP	346583
		Hosakote Bangalore Urban District (Chikballapur)	2711
Dasarahalli Zone	Dasarahalli	Shettyhalli BBMP	134363
		Dasarahalli BBMP	124621
		Peenya Industrial Area BBMP	61111
	Hegganahalli	Peenya Industrial Area BBMP	66011
		Hegganahalli BBMP	317122
East Zone	Hebbal	Hebbal BBMP	220896
		Hebbal Bangalore Urban District (Bangalore North)	2603
		J C Nagar BBMP	221483
	Pulikeshinagar	Kadugondanahalli BBMP	237834
		Pulikeshinagar BBMP	171178
	Sarvagna Nagar	Maruthisevanagar BBMP	242073
		HBR Layout BBMP	345301
	C V Raman Nagar	Jeevan Bhim Nagar BBMP	177045
		C V Raman Nagar BBMP	293502
	Shivajinagar	Shivajinagar BBMP	169727
		Vasanthnagar BBMP	161513
	Shanthinagar	Shanthinagar BBMP	164379

Zone	Division	Sub-Division	Population 2023
		Domlur BBMP	229917
West Zone	Malleswaram	Mathikere BBMP	166121
		Malleswaram BBMP	214962
	Gandhinagar	Gandhinagar BBMP	215304
		Chickpet BBMP	173383
	Rajajinagar	Sriram Mandira BBMP	177009
		Rajajinagar BBMP	186620
	Govindaraja Nagar	Govindaraja Nagar BBMP	272491
		Chandra Layout BBMP	205808
	Chamarajpet	J.J.R. Nagar BBMP	209713
		Chamarajpet BBMP	161787
	Mahalakshmipura	Mahalakshmipura BBMP	243119
		Nagpura BBMP	248238
Total BBMP + BUD Population			**68,39,609**
Floating Population in North Package			**4,89,207**
Total Population in North Package (2023)			**73,28,816**
Total Population in North Package (2030)			**95,15,142**

South Package - South: RR Nagar Zone, Mahadevpura Zone, South Zone and Bommanahalli Zone

Table 1 The distribution of Ward and Population in South Package.

Zone	Division	Sub-Division	Population 2023
Rajarajeshwari Nagar Zone	Rajarajeshwari Nagar	Rajarajeshwari Nagar BBMP	125796
		Laggere BBMP	105824
		Lakshmidevi Nagar BBMP	127225
	Yeshwanthpur	Yeshwanthpur BBMP	357582

Zone	Division	Sub-Division	Population 2023
		Yeshvanthapura Bangalore Urban District (Bangalore North)	118076
	Kengeri	Kengeri BBMP	181460
		Herohalli BBMP	265838
		Bangalore South Bangalore Urban District (Bangalore Rural)	110482
		Anekal Bangalore Urban District (Bangalore Rural)	113315
Mahadevapura Zone	K.R. Puram	Horamavu BBMP	117999
		K.R. Puram BBMP	255400
		K.R. Pura Bangalore Urban District (Bangalore North)	6467
		HAL Airport BBMP	325944
	Mahadevapura	Hoodi BBMP	131283
		Whitefield BBMP	177006
		Marathalli BBMP	367526
		Mahadevpura Bangalore Urban District (Bangalore Central)	38018
South Zone	Padmanabhanagar	Padmanabhanagar BBMP	227679
		Banashankari BBMP	251602
	Jayanagar	Jayanagar BBMP	241996
		J P Nagar BBMP	117564
	BTM Layout	BTM BBMP	239583
		Koromangala BBMP	272495
	Chickpet	Kempegowdanagar BBMP	242101
		Hombegowdanagar BBMP	124498
	Vijayanagar	Vijayanagar BBMP	228482
		Gali Anjaneyaswamy Temple BBMP	278994
	Basavanagudi	Basavanagudi BBMP	179680
		Girinagar BBMP	200880

Zone	Division	Sub-Division	Population 2023
Bommanahalli Zone	Bommanahalli	H S R Layout BBMP	113603
		Bommanahalli BBMP	177629
		Bommanahalli Bangalore Urban District (Bangalore South)	1274
		Arakere BBMP	434008
	Uttarahalli	Uttarahalli BBMP	126128
		Yelachenahalli BBMP	119501
		Anjanapura BBMP	121718
		Begur BBMP	64187
	Anjanapura	Begur BBMP	54763
			209266
Estimated Total BBMP + BUD Population			**69,52,872**
Estimated Floating Population in South Package			**4,89,207**
Estimated Total Population in South Package (2023)			**74,42,079**
Estimated Total Population in South Package (2030)			**9,662,193**

Table 18: Zone wise Population and waste estimate

3.3 Proposed Plan for the Project

Based on 2011 Census data and an annual population growth rate of 3.8%, waste generation within the Project Area has been projected for 2030. This projection uses a daily per capita rate of 400 grams for the resident population and 100 grams for the floating population, excluding bulk waste. While the facility is expected to commence operations around the year 2028, the waste generation estimates have been calculated for 2030 in order to account for full operational capacity and long-term planning. By 2030, the total municipal solid waste from households—excluding bulk waste—is expected to be about 7,290 tonnes per day (TPD). The project scope also covers street-sweeping waste collected by BBMP, recorded at 670 TPD in 2023 (as per the DPR study on Garbage Vulnerable Points), which is projected to 870 TPD in 2030 using the same annual growth rate of 3.8%.

Estimated Waste Generated in the Project Area			
For Year 2030	**Population (Million)**	**Per capita Waste (gm/day/capita)**	**Waste Generated (TPD)**
BBMP	17.2	400	6,872
Urban District	0.7	400	291
Floating	1.3	100	127
Sub-Total	**19.2**	-	**7,290**
Street-sweeping	-	-	**870**
Total	-	-	**8,160**

The Project Area includes several existing waste processing facilities, to which BSWML has prior commitments for waste supply. These facilities fall into two categories: decentralized plants, which are smaller and located within the city, and centralized plants, which are larger and situated on the outskirts. Further details are provided in the Table below.

Approximate BSWML commitments to existing plants			
Type of Waste	**Decentralized (TPD)**	**Centralized (TPD)**	**Total Quantity (TPD)**
Sanitary waste	25	0	25
Animal waste	8	0	8
Wet waste	105	750+300	1,155
Dry waste	300	600	900
Total	**438**	**1,650**	**2,088**

The responsibility for secondary transportation to decentralized facilities (within the city) does not fall under the scope of this tender and will instead be carried out by the Primary Collection & Transport vendor(s). As a result, the associated waste quantity of 438 tons per day (TPD) is excluded from both secondary transportation and processing and disposal. With this adjustment, the total waste quantity for secondary transportation under this tender is estimated at 7,722 TPD.

Furthermore, waste allocated to existing facilities (such as the MSGP and Bidadi KPCL WTE plants) under existing contractual obligations will not be available to the Concessionaire for processing. The Concessionaire's responsibility is limited to secondary transportation of this waste.

Consequently, the total quantity of waste available for processing and disposal within the Concessionaire's scope is 6,072 TPD.

Table 3 below summarizes the capacities to be managed through secondary transportation and processing and disposal (P&D) for each waste category, after considering these existing contractual commitments.

Estimated Mass Profile of Waste to be managed				
Type of Waste	**% of Waste**	**Waste Generated (TPD)**	**Waste for Secondary Transport (TPD)[a]**	**Waste for P&D (TPD)[b]**
Dry Waste	43%	3,135	2,946	2,235
Wet Waste	50%	3,638	3,419	2,483
Sanitary waste	1%	73	48	48
Animal waste	1%	73	65	65
Animal carcass	0%	7	7	7
Domestic hazard waste	1%	73	73	73
Stones	1%	73	73	73
Silt & Inerts	2%	146	146	146
Debris	1%	73	73	73
Leachate[c]	5%			182
Part 1 (Total)	**100**	**7,290**	**6,852**	**5,202**
Street-sweeping Dry	85%	739	739	739
Street-sweeping Wet	15%	130	130	130
Part 2 (Total)	**100**	**870**	**870**	**870**
Total waste		**8,160**	**7,722**	**6,072**

a. After subtracting de-centralized BSWML commitments to existing plants as per Table 2
b. After subtracting centralized BSWML commitments to existing plants as per Table 2
c. Leachate is considered as 5% of the Wet Waste.

Secondary Transportation

In order to carry out the Secondary Transportation of MSW, BSWML will provide key infrastructure for secondary waste transportation, including hook-loaders and containers, along with Transfer Stations on an as-is where-is basis. Hook-loaders and container, operated by a two-person team, have a 10-year service life and must be replaced thereafter by the Developer. Parking stations, workshops, and administrative offices will be have to be constructed under the Project as well.

The developer shall be responsible for creating the most optimal transport routes to ensure high efficiency while meeting project KPIs.

Estimated requirement for Secondary Transportation			
Package	**No. of containers**	**No. of trips per Hook loader**	**Approximate Hookloaders required**
North Package	**306**	**2**	**186**
South Package	**312**	**2**	**190**

Processing & Disposal

The waste allocated for Processing and Disposal (P&D) may be further distributed as per the table below:

Indicative Waste Allocation across units for P&D		
#	**Facility**	**Input material**
1.	Waste to Energy Plant	Dry waste from MSW (excluding recyclables and inerts) + rejects from Bio-methanation
2.	Bio-methanation	Wet waste from MSW + wet waste from street-swept waste
3.	Composting	Wet waste from MSW + wet waste from street-swept waste
4.	Landfill	Stones/silt/inerts from MSW + dry waste from street-swept waste + rejects from WTE plant
5.	Animal rendering plant	Animal waste from meat shops
6.	Sanitary waste incineration	Sanitary waste
7.	Animal incineration	Animal carcass
8.	Leachate treatment plant	Leachate

The following estimated capacities may be considered for meeting the Processing and Disposal (P&D) requirements under the Integrated Solid Waste Management (ISWM) project. These figures are indicative and intended solely for reference. Developers are expected to conduct their own due diligence, including independent assessments and analysis, to determine the appropriate configuration and capacity of processing units. These estimates should not be construed as prescriptive or as representing the minimum required capacities to be established.

Indicative Capacity for Processing & Disposal				
Planned Capacity (TPD)		**North Package**	**South Package**	**Total**
Bio Methanation	TPD	1,123	1,556	2,679
Composting	TPD	125	173	298
WTE	TPD	1,238	701	1,938
Animal Rendering	TPD	28	37	65

Indicative Capacity for Processing & Disposal				
Animal Carcass	TPD	4	4	7
Sani waste	TPD	21	27	48
Sorting Facility	TPD	1,301	1,273	2,574
Leachate Treatment Plant	TPD	180	183	364
MRF Facility	TPD	488	477	965

Revenues from Processed materials

Apart from the **tipping fee**, which is payable by the Authority based on actual tonnage handled across two components: **Secondary Transportation,** and **Processing & Disposal (P&D),** four other streams of revenue may be considered for the developer (indicative list, not exhaustive):

- Sale of biogas produced at bio-methanation plants
- Sale of electricity generated from waste-to-energy (WTE) facilities
- Sale of recovered recyclables processed at Material Recovery Facilities (MRFs)
- Sale of by-products from animal rendering to piggeries, etc.

6. LIST OF ANNEXURES

Annexure 1:

A. List of Transfer Stations [LTS: Large Transfer Station; MTS: Mini Transfer Station]

Table: List of Transfer Stations						
No.	**Package**	**Status (Operational/under construction/to be constructed)**	**Capacity/Proposed Capacity (in Ton)**	**Operated by (if any)**	**O&M Contract End Date (if any)**	**Location/Proposed Location**
1	North Package	LTS-Chamarajpete (Operational)	150 TPD	M/s Parishudh Ventures	Dec-31	Adjacent to Binny mills, Chamarajpete
2	North Package	LTS-Sarvagnanagara (under construction)	150 TPD	M/s Parishudh Ventures	Yet to be confirmed	HBR Layout
3	North Package	LTS-Malleshwaram (To be constructed)	150 TPD		Yet to be confirmed	Malleshwaram
4	North Package	LTS-Rajajinagara (To be constructed)	150 TPD		Yet to be confirmed	Rajajinagara
5	North Package	LTS-Govindaraj Nagara (To be constructed)	250 TPD		Yet to be confirmed	Govindaraj Nagara
6	North Package	LTS-Mahalaxmi Layout (To be constructed)	250 TPD		Yet to be confirmed	Mahalaxmi Layout
7	North Package	LTS-Gandhinagara (To be constructed)	250 TPD		Yet to be confirmed	Gandhinagara
8	North Package	LTS-Pulakeshinagara (To be constructed)	250 TPD		Yet to be confirmed	Pulakeshinagara
9	North Package	LTS-Shnathinagara (To be constructed)	250 TPD		Yet to be confirmed	Shnathinagara
10	North Package	LTS-Hebbal (To be constructed)	250 TPD		Yet to be confirmed	Hebbal
11	North Package	LTS-CV Ramanagara (To be constructed)	250 TPD		Yet to be confirmed	CV Ramanagara

Table: List of Transfer Stations						
No.	**Package**	**Status (Operational/under construction/to be constructed)**	**Capacity/Proposed Capacity (in Ton)**	**Operated by (if any)**	**O&M Contract End Date (if any)**	**Location/Proposed Location**
12	North Package	LTS-Shivajinagara (To be constructed)	250 TPD		Yet to be confirmed	Shivajinagara
13	North Package	LTS-Yelahanka (To be constructed)	250 TPD		Yet to be confirmed	Yelahanka
14	North Package	LTS-Byatarayanapura (To be constructed)	250 TPD		Yet to be confirmed	Byatarayanapura
15	North Package	LTS-Dasarahalli (To be constructed)	250 TPD		Yet to be confirmed	Dasarahalli
16	North Package	LTS-BUD (To be constructed)	250 TPD		Yet to be confirmed	To be decided
17	North Package	MTS-East Zone, CVRaman Nagara division, Ward 58- New Tippasandra (Operational)	30 TPD	M/s TPS Infrstructure	Apr-29	New Tippasandra
18	North Package	MTS-East Zone, Shivajinagara Division,Ward 90 -Ulsoor (Under Additional Construction Progress)	30 TPD	M/s TPS Infrstructure	Yet to be confirmed	Ulsoor
19	North Package	MTS-East Zone, Shanthinagara divison, ward 111- Shanthala Nagar (Operational)	30 TPD	M/s TPS Infrstructure	Aug-30	Shanthala Nagar
20	North Package	MTS-East Zone, shanthinagar Division,ward- 112 Domlur (Operational)	30 TPD	M/s TPS Infrstructure	Aug-30	Domlur

Table: List of Transfer Stations						
No.	**Package**	**Status (Operational/under construction/to be constructed)**	**Capacity/Proposed Capacity (in Ton)**	**Operated by (if any)**	**O&M Contract End Date (if any)**	**Location/Proposed Location**
21	North Package	MTS-East Zone, Hebbal division ,Ward 18 -radhakrishna temple (Operational)	30 TPD	M/s TPS Infrstructure	Jan-28	radhakrishna temple
22	North Package	MTS-Yelahanka Zone, Byatarayanapura Divsision, Ward no.11, Singapore (Under Additional Construction Progress)	30 TPD	M/s TPS Infrstructure	Yet to be confirmed	Singapore
23	North Package	MTS-West Zone, Gandhi Nagara Division- Ward no 94-Gandhi Nagara (Under Additional Construction Progress)	30 TPD	M/s TPS Infrstructure	Yet to be confirmed	Gandhi Nagara
24	North Package	MTS-West Zone, Mahalaxmi Layout Division, Ward no 44-Marappan Palya, (Operational)	30 TPD	M/s TPS Infrstructure	Dec-30	Marappan Palya
25	North Package	MTS-Dasarahalli Zone, Dasarahalli Division, , Ward no 12-Shetty Halli (Operational)	30 TPD	M/s TPS Infrstructure	Feb-29	Shetty Halli
26	North Package	MTS-Dasarahalli Zone, Dasarahalli Division, , Ward no 13-Mallasandra (Under Additional Construction Progress)	30 TPD	M/s TPS Infrstructure	Yet to be confirmed	Mallasandra

Table: List of Transfer Stations

No.	Package	Status (Operational/under construction/to be constructed)	Capacity/Proposed Capacity (in Ton)	Operated by (if any)	O&M Contract End Date (if any)	Location/Proposed Location
27	North Package	MTS-Dasarahalli Zone, Dasarahalli Division, , Ward no 39-Chokkasandra (Under Additional Construction Progress)	30 TPD	M/s TPS Infrstructure	Yet to be confirmed	Chokkasandra
28	North Package	MTS-Dasarahalli Zone, Dasarahalli Division, , Ward no 14-Balagagunte (Operational)	30 TPD	M/s TPS Infrstructure	Feb-32	Balagagunte
29	South Package	LTS- BTM Layout Koramangala (Operational)	150 TPD	M/s Parishudh Ventures	Yet to be confirmed	Ejipura, Ward-148
30	South Package	LTS- Jayanagara (To be constructed)	150 TPD		Yet to be confirmed	Jayanagara
31	South Package	LTS- Chickpete (To be constructed)	250 TPD		Yet to be confirmed	Chickpete
32	South Package	LTS- Padmanabhanagara (To be constructed)	250 TPD		Yet to be confirmed	Padmanabhanagara
33	South Package	LTS- Vijayanagara (To be constructed)	250 TPD		Yet to be confirmed	Vijayanagara
34	South Package	LTS- Basavanagudi (To be constructed)	150 TPD		Yet to be confirmed	Basavanagudi
35	South Package	LTS- RR Nagara (To be constructed)	250 TPD		Yet to be confirmed	RR Nagara
36	South Package	LTS- Kengeri (To be constructed)	250 TPD		Yet to be confirmed	Kengeri

Table: List of Transfer Stations						
No.	**Package**	**Status (Operational/under construction/to be constructed)**	**Capacity/Proposed Capacity (in Ton)**	**Operated by (if any)**	**O&M Contract End Date (if any)**	**Location/Proposed Location**
37	South Package	LTS- Mahadevapura (To be constructed)	250 TPD		Yet to be confirmed	Mahadevapura
38	South Package	LTS- KR Puram (To be constructed)	250 TPD		Yet to be confirmed	KR Puram
39	South Package	LTS- Bommanahalli (To be constructed)	250 TPD		Yet to be confirmed	Bommanahalli
40	South Package	LTS- Bangalore South Division (To be constructed)	250 TPD		Yet to be confirmed	Bangalore South Division
41	South Package	LTS- BUD -1 (To be constructed)	250 TPD		Yet to be confirmed	To be decided
42	South Package	LTS- BUD-2 (To be constructed)	250 TPD		Yet to be confirmed	To be decided
43	South Package	MTS-Rajarajeshwari Nagara Zone, Yeshwanthapura (Kengeri) division, ward no 130- Ullal (Operational)	30 TPD	M/s TPS Infrstructure	Jan-28	Ullal
44	South Package	MTS-Rajarajeshwari Nagara Zone, Rajarajeshwari Nagara division, ward no 73- Kottigepalya, (Operational)	30 TPD	M/s TPS Infrstructure	Dec-27	Kottigepalya
45	South Package	MTS-Rajarajeshwari Nagara Zone, Rajarajeshwari Nagara division, ward no 42- Lakshmidevinagar (Operational)	30 TPD	M/s TPS Infrstructure	Jun-29	Lakshmidevinagar

Table: List of Transfer Stations						
No.	**Package**	**Status (Operational/under construction/to be constructed)**	**Capacity/Proposed Capacity (in Ton)**	**Operated by (if any)**	**O&M Contract End Date (if any)**	**Location/Proposed Location**
46	South Package	MTS-Rajarajeshwari Nagara Zone, Kengeri division Ward 198 hemmigepura (Operational)	30 TPD	M/s TPS Infrstructure	Dec-30	hemmigepura
47	South Package	MTS-Bommanahalli Zone,,Bengaluru South division ward 196- Anjanapura (Operational)	30 TPD	M/s TPS Infrstructure	Dec-30	Anjanapura
48	South Package	MTS-Bommanahalli Zone,,Bengaluru South division ward 194- Gottigere (Operational)	30 TPD	M/s TPS Infrstructure	Jan-31	Gottigere
49	South Package	MTS-Bommanahalli Zone,,Bengaluru South division Ward 192 - Begur (Operational)	30 TPD	M/s TPS Infrstructure	Dec-30	Begur
50	South Package	MTS-Bommanahalli Zone,Bengaluru South division, ward 197-Vasnathapura (Operational)	30 TPD	M/s TPS Infrstructure	Jan-28	Vasnathapura
51	South Package	MTS-South Zone, BTM Layout Division,Ward 151 - Koramangala(Operational)	30 TPD	M/s TPS Infrstructure	Mar-30	Koramangala
52	South Package	MTS-South Zone, Chickppete division, ward 118-JC road (Operational)	30 TPD	M/s TPS Infrstructure	Jan-28	JC road

Table: List of Transfer Stations

No.	Package	Status (Operational/under construction/to be constructed)	Capacity/Proposed Capacity (in Ton)	Operated by (if any)	O&M Contract End Date (if any)	Location/Proposed Location
53	South Package	MTS-Mahadevpura Zone, Mahadevapura Division Ward no.149, Varthur (Under Additional Construction Progress)	30 TPD	M/s TPS Infrstructure	Yet to be confirmed	Varthur
54	South Package	MTS-Mahadevapura Division, K.R. Puram division,ward 56-A.Narayanapura (Under Additional Construction Progress)	30 TPD	M/s TPS Infrstructure	Yet to be confirmed	A.Narayanapura
55	South Package	MTS-Mahadevpura Zone, Mahadevapura Division Ward no.85, Doddenakundi (Under Additional Construction Progress to be takenup)	30 TPD	M/s TPS Infrstructure	Yet to be confirmed	Doddenakundi
56	South Package	MTS-(Under Additional Construction Progress)pura Division Ward no.85, Doddenakundi (Under Additional Construction To be taken up)	30 TPD	M/s TPS Infrstructure	Yet to be confirmed	Doddenakundi

B. Typical Contents of Transfer Stations

Mini Transfer Station:

Typical Layout of Transfer Station

Mini Transfer Station - 30*40 Shed

List of assets included in a Transfer Station

2 Portable Compactors

1 Hook loader

1 Building/Shed With WWPL Collection Tank & Toilet

1 DG Set

1 Fire Extinguisher

Large transfer Station:

Typical Layout of Transfer Station

1 Tipper Bay and Container change over bay

1 hook loader

1 Roof truss

1 Leachate Tank

List of assets included in a Transfer Station

2 Stationary Compactors

6 hook loaders

13 nos 20 Cum Containers

2 weigh Bridge

C. Existing Commitments of BSWML

No.	Package	Name of Plant	Type of Plant (WTE/Bio-meth, etc)	Type of Waste to be delivered	Operated by (Name of contractor)	Commitment End Date	Location
1	North	MSGP Plant	Composting	Wet	MSGP	Oct-34	Chigarenhalli, Doddabelavnagala Hobli
2	North	Kogilu Bio-meth plant	Bio-meth	Wet	M/s Om Aparajite LLP	Yet to be confirmed (15 years from COD)	Kogilu Sy No. 99, W No. 05
3	North	Kogilu Sani-waste processing plant	Sani waste	Sani Waste	M/s Om Aparajite LLP	Yet to be confirmed (15 years from COD)	Kogilu Sy No. 99, W No. 06
4	North	Kogilu Animal Rendering Plant	Animal waste rendering	Animal waste	M/s Om Aparajite LLP	Yet to be confirmed (15 years from COD)	Kogilu Sy No. 99, W No. 07
5	North	Kogilu Animal Carcasses Incineration	Animal Incineration	Animal Carcasses	M/s Om Aparajite LLP	Yet to be confirmed (15 years from COD)	Kogilu Sy No. 99, W No. 08
6	North	Mattikere - 35 West zone	Biometh	Wet	M/s Carbon Masters	Sep-29	Mattikere
7	North	Gandhinagar - 94 West zone	Biometh	Wet	M/s Carbon Masters	Sep-29	Gandhinagar
8	North	Kuvempu Nagar - 11, Yelahanka zone	Biometh	Wet	To be repaired	Yet to be confirmed (5 years from COD)	Kuvempu Nagar
9	North	SKR Market - 139, West zone	Biometh	Wet	M/s Carbon Masters	Yet to be confirmed (5 years from COD)	SKR Market
10	North	Domlur - 112 East zone	Biometh	Wet	M/s Carbon Masters	Sep-29	Domlur - 112

No.	Package	Name of Plant	Type of Plant (WTE/Bio-meth, etc)	Type of Waste to be delivered	Operated by (Name of contractor)	Commitment End Date	Location
11	North	Domlur - 112 East zone (New)	Biometh	Wet	M/s Carbon Masters	Yet to be confirmed (15 years from COD)	Domlur - 112 (New)
12	North	Kalyana Nagara - East Zone (New)	Biometh	Wet	M/s Carbon Masters	Yet to be confirmed (15 years from COD)	Kalyana Nagara - (New)
13	South	GAIL Plant	Biometh	Wet	GAIL	Yet to be confirmed (30 years from COD)	KCDC - Kudlu
14	South	Waste to Energy Bidadi Plant	WTE	RDF	KPCL	Yet to be confirmed (30 years from COD)	Bidadi
15	South	Gunjur Sani-waste processing plant	Sani waste	Sani Waste	M/s Om Aparajite LLP	Yet to be confirmed (15 years from COD)	Gunjur
16	South	Jayanagar- 168, South zone	Biometh	Wet	M/s Carbon Masters	Sep-29	Jayanagar
17	South	KCDC - 191, Bommanahalli zone	Biometh	Wet	To be repaired		KCDC
18	South	Begur - 192 Bommanahalli zone	Biometh	Wet	To be repaired		Begur
19	South	Varthur - 149, Mahadevapura zone	Biometh	Wet	M/s Carbon Masters	Yet to be confirmed (5 years from COD)	Varthur
20	South	Lingadheeranahalli - 198, RR Nagara zone	Biometh	Wet	M/s Carbon Masters	Yet to be confirmed (5 years from COD)	Lingadheeranahalli
21	South	Koramangala -151, South Zone	Biometh	Wet		Yet to be confirmed (5 years from COD)	Koramangala
22	South	Jayanagara/ Yadiyuru - 167 South Zone	Biometh	Wet	Manjunath Enterprises		Jayanagara/ Yadiyuru

No.	Package	Name of Plant	Type of Plant (WTE/Bio-meth, etc)	Type of Waste to be delivered	Operated by (Name of contractor)	Commitment End Date	Location
23	South	Koramangala -151, South Zone (New)	Biometh	Wet	M/s Carbon Masters	Yet to be confirmed (15 years from COD)	Koramangala

D. List of DWCCs (Dry Waste Collection Centers)

Table: List of DWCCs

No.	Package	Ward No.	Name of DWCC	Capacity (in Ton)	**Operated by** (Name of contractor/Association, etc)	Location
1	North Package	023	Nagavara	3.0	Waste Pickers/ SHG	Nagavara
2	North Package	024	HBR	3.0	Sugandhira	HBR
3	North Package	029	Kacharakanahalli	0.8	Krishnaveni	Kacharakanahalli
4	North Package	058	New Tippasandara	10.0	Lakshmi	New Tippasandara
5	North Package	079	Sarvagnanagara	1.5	Muthamma	Sarvagnanagara
6	North Package	080	Hoysala Nagar	2.0	Vimala	Hoysala Nagar
7	North Package	113	Konena Agrahara	10.0	Waste Pickers/ SHG	Konena Agrahara
8	North Package	031	Kushal nagar	0.6	Waste Pickers/ SHG	Kushal nagar
9	North Package	032	Kaval Byarasandra	0.9	Waste Pickers/ SHG	Kaval Byarasandra
10	North Package	048	Muneshwara nagar	0.8	Munnavara pasha	Muneshwara nagar
11	North Package	061	S K Garden	0.7	Waste Pickers/ SHG	S K Garden
12	North Package	112	Domlur	3.0	Waste Pickers/ SHG	Domlur
13	North Package	094	Gandhinagar	3.0	Waste Pickers/ SHG	Gandhinagar
14	North Package	077	Dattathreya Temple	0.5	Shankar Enterprises	Dattathreya Temple

Table: List of DWCCs						
No.	**Package**	**Ward No.**	**Name of DWCC**	**Capacity (in Ton)**	**Operated by** (Name of contractor/Association, etc)	**Location**
15	North Package	120	Cottonpet	1.5	Waste Pickers/ SHG	Cottonpet
16	North Package	139	K R Market	0.7	Waste Pickers/ SHG	K R Market
17	North Package	104	Govindarajanagara	0.4	Waste Pickers/ SHG	Govindarajanagara
18	North Package	125	Marenahalli	0.4	Waste Pickers/ SHG	Marenahalli
19	North Package	105	Agrahara Dasarahalli	2.0	Waste Pickers/ SHG	Agrahara Dasarahalli
20	North Package	044	Marappanapalya	0.8	Waste Pickers/ SHG	Marappanapalya
21	North Package	067	Nagapura	0.8	Waste Pickers/ SHG	Nagapura
22	North Package	075	Shankarmutt	0.8	Waste Pickers/ SHG	Shankarmutt
23	North Package	045	Malleshwaram	0.8	Waste Pickers/ SHG	Malleshwaram
24	North Package	064	Rajmahal guttahaali	0.5	Waste Pickers/ SHG	Rajmahal guttahaali
25	North Package	065	kadumalleshwar	1.0	Waste Pickers/ SHG	kadumalleshwar
26	North Package	035	Aramanenagar	5.0	Waste Pickers/ SHG	Aramanenagar
27	North Package	076	Gayatrinagar	5.0	Waste Pickers/ SHG	Gayatrinagar
28	North Package	098	PRAKASHNAGARA	0.5	Waste Pickers/ SHG	PRAKASHNAGARA
29	North Package	041	Peenya Industrial Area	1.0	Geetha	Peenya Industrial Area

Table: List of DWCCs						
No.	**Package**	**Ward No.**	**Name of DWCC**	**Capacity (in Ton)**	**Operated by** (Name of contractor/Association, etc)	**Location**
30	North Package	070	Rajagopal Nagar	11.0	Gopal Krishna	Rajagopal Nagar
31	North Package	001	Kempegowda	3.5	Somiah	Kempegowda
32	North Package	002	Chowdeshwari	3.5	Lakshmi	Chowdeshwari
33	North Package	003	Attur layout	3.5	S Masthan	Attur layout
34	North Package	004	Yelahanka New Town	3.5	Lakshmi Bayi	Yelahanka New Town
35	North Package	005	Jakkur	3.0	Waste Pickers/ SHG	Jakkur
36	North Package	006	Tanisandra	3.0	Waste Pickers/ SHG	Tanisandra
37	North Package	011	Kuvempunagara	3.0	Waste Pickers/ SHG	Kuvempunagara
38	North Package	078	Pulikeshinagar	1.0	Muniyamma	Pulikeshinagar
39	North Package	050	Benniganahalli	2.0	Waste Pickers/ SHG	Benniganahalli
40	North Package	088	Jeevanbhima Nagar	6.0	Waste Pickers/ SHG	Jeevanbhima Nagar
41	North Package	106	Dr|| Rajkumar Ward	0.4	Waste Pickers/ SHG	Dr|| Rajkumar Ward
42	North Package	040	Dodddabidarekallu	3.0	Waste Pickers/ SHG	Dodddabidarekallu
43	North Package	013	Shettihalli	4.0	Waste Pickers/ SHG	Shettihalli

Table: List of DWCCs						
No.	**Package**	**Ward No.**	**Name of DWCC**	**Capacity (in Ton)**	**Operated by** (Name of contractor/Association, etc)	**Location**
44	North Package	086	Marattahalli	4.0	Waste Pickers/ SHG	Marattahalli
45	North Package	128	Nagarabhavi	3.0	Waste Pickers/ SHG	Nagarabhavi
46	North Package	018	Radhakrishna	3.0	Waste Pickers/ SHG	Radhakrishna
47	North Package	019	Sanjaynagar	3.0	Waste Pickers/ SHG	Sanjaynagar
48	North Package	020	Ganganagar	3.0	Waste Pickers/ SHG	Ganganagar
49	North Package	021	Hebbal	3.0	Waste Pickers/ SHG	Hebbal
50	South Package	101	KamakshiPaliya	0.4	Waste Pickers/ SHG	KamakshiPaliya
51	South Package	108	SRIRAMMANDIRA	0.3	Manjula	SRIRAMMANDIRA
52	South Package	146	Lakkasandra	3.0	Kumar	Lakkasandra
53	South Package	151	Koramangala	5.0	Waste Pickers/ SHG	Koramangala
54	South Package	172	Madiwala	3.5	Waste Pickers/ SHG	Madiwala
55	South Package	173 &176	Jakkasandra	5.0	Waste Pickers/ SHG	Jakkasandra
56	South Package	170	Jayanagar East	1.0	Waste Pickers/ SHG	Jayanagar East
57	South Package	177	JP Nagar	2.0	Waste Pickers/ SHG	JP Nagar

Table: List of DWCCs						
No.	**Package**	**Ward No.**	**Name of DWCC**	**Capacity (in Ton)**	**Operated by** (Name of contractor/Association, etc)	**Location**
58	South Package	178	Sarakki	1.2	Waste Pickers/ SHG	Sarakki
59	South Package	123	Vijayanagar	0.7	Waste Pickers/ SHG	Vijayanagar
60	South Package	132	Attiguppe	0.8	Waste Pickers/ SHG	Attiguppe
61	South Package	133	Hampinagara	1.0	Waste Pickers/ SHG	Hampinagara
62	South Package	157	Gali Anjaneya Temple	0.4	Waste Pickers/ SHG	Gali Anjaneya Temple
63	South Package	051	Vijnanapura	1.1	Priyadatshini	Vijnanapura
64	South Package	056	A Narayanapura	1.2	Hombale mahila hokkuta	A Narayanapura
65	South Package	082	Garudacharpalya	1.0	Mahadevapura Mahila Okkuta(Nagarathna)	Garudacharpalya
66	South Package	012	Shettihalli	3.0	Waste Pickers/ SHG	Shettihalli
67	South Package	014	Bagalagunte	1.5	Sridhar	Bagalagunte
68	South Package	039	Chokkasandra	3.5	Chandrappa	Chokkasandra
69	South Package	038	R R NAGARA	1.5	LINGARAJU	R R NAGARA
70	South Package	073	Kottegepalya	4.0	Waste Pickers/ SHG	Kottegepalya
71	South Package	072	Herohalli	2.0	Srinivas(Jothisha)	Herohalli

Table: List of DWCCs						
No.	**Package**	**Ward No.**	**Name of DWCC**	**Capacity (in Ton)**	**Operated by** (Name of contractor/Association, etc)	**Location**
72	South Package	130	Ullalu	3.0	SHG Shubodaya Nirantara ulitaya group	Ullalu
73	South Package	159	Kengeri	2.0	Sree Mahalakhmi Sthri Shakthi sanga	Kengeri
74	South Package	198	Hemmigepura	3.0	Jairam(Kruthika Enterprises)	Hemmigepura
75	South Package	184	Uttrahalli	2.5	Shivalingaiah/Harish Reddy	Uttrahalli
76	South Package	185	Yelachenahalli	1.4	Repon Khan/Sujan	Yelachenahalli
77	South Package	191	Singasandra	2.5	Mizan/ Sunil Reddy	Singasandra
78	South Package	192	Begur	4.2	Mizan/ Sunil Reddy	Begur
79	South Package	194	Gottigere	4.2	Ajay kumar	Gottigere
80	South Package	195	Konanakunte	3.9	Sathya	Konanakunte
81	South Package	196	Anjanapura	1.8	Gopal Biswas/Riyaz	Anjanapura
82	South Package	197	Vasanthapura	2.7	Mohamed Juel/Antony Raj	Vasanthapura
83	South Package	193	Arakere	4.5	Koraban Ali	Arakere
84	South Package	186	Jaraganahalli	1.5	Honnuf Khatun	Jaraganahalli
85	South Package	187	Puttenahalli	4.0	Sudha	Puttenahalli

Table: List of DWCCs						
No.	**Package**	**Ward No.**	**Name of DWCC**	**Capacity (in Ton)**	**Operated by** (Name of contractor/Association, etc)	**Location**
86	South Package	188	Bilekahalli	3.5	Nargis	Bilekahalli
87	South Package	189	Hongasandra	6.0	Anif	Hongasandra
88	South Package	190	Mangammanapalya	8.0	Siddiq	Mangammanapalya
89	South Package	174	HSR	7.5	Geetha	HSR
90	South Package	175	Bommanahalli	3.5	Jahagir Husain	Bommanahalli
91	South Package	156	Srinagar	2.0	Waste Pickers/ SHG	Srinagar
92	South Package	166	Karisandra	4.0	Waste Pickers/ SHG	Karisandra
93	South Package	182	Padmanabhanagar	2.0	Waste Pickers/ SHG	Padmanabhanagar
94	South Package	179	Shakambari Nagar	1.8	Waste Pickers/ SHG	Shakambari Nagar
95	South Package	160	R R NAGARA	4.0	Waste Pickers/ SHG	R R NAGARA
96	South Package	026	Ramamurthy Nagar	2.0	Waste Pickers/ SHG	Ramamurthy Nagar
97	South Package	052	K.R. Puram	2.0	Waste Pickers/ SHG	K.R. Puram
98	South Package	147	Adugodi	3.0	Waste Pickers/ SHG	Adugodi
99	South Package	148	Ejipura	3.0	Waste Pickers/ SHG	Ejipura

Table: List of DWCCs						
No.	**Package**	**Ward No.**	**Name of DWCC**	**Capacity (in Ton)**	**Operated by** (Name of contractor/Association, etc)	**Location**
100	South Package	152	Suddagunte palya	1.5	Waste Pickers/ SHG	Suddagunte palya
101	South Package	150	Bellandur	4.0	Waste Pickers/ SHG	Bellandur
102	South Package	085	Doddanekundi	4.0	Waste Pickers/ SHG	Doddanekundi
103	South Package	145	Hombegowdanagar	4.0	Waste Pickers/ SHG	Hombegowdanagar
104	South Package	183	Chikkalsandra	4.0	Waste Pickers/ SHG	Chikkalsandra

Note: Data presented in Annexure 2 is for indicative purposes only and the Bidder must undertake their own analysis and studies to ascertain the same.

Annexure 2: Details of proposed sites

(Annexed as part of RFP of respective Package)

Annexure 3: Details of existing solid waste management system in Bengaluru

1. Doorstep Collection

The Primary Objective of BSWML is to see that citizens are provided the services of waste collection and all the discarded material are moved out for processing and disposal before 12.00 noon. The aim is to see that services are delivered early in the morning and waste is segregated by generator, collected and then transported to a processing facility. The objective is to remove discarded materials from inhabited places promptly to prevent the spread of disease, to reduce aesthetic results arising from putrefying organic matter, and, equally important, to dispose of the discarded materials in a manner that is environmentally acceptable

Following are the salient features of the existing Door to Door Waste Collection Services

1. BSWML is providing daily waste collection service to all the households, slums, shops and establishments. Entire collection and transportation activities have been outsourced.
2. Presently 4,900 Auto tippers are collecting waste from various streets, lanes. Roads in the city of Bengaluru.
3. All the primary vehicles i.e. auto tipper will carry the waste from ward level to the transfer station or the refuse compactor stationed at specific locations for secondary collection and transportation of waste to the decentralized facilities or the dumpsite Every 3 to 4 auto tippers are backed by one refuse compactor.

4. The auto tippers are mainly three wheelers with hoppers of (500 kg) capacity. However a few of them are of bigger size. They are manned by 1 driver + 1 helper.
5. Each auto tipper covers 750 households per day which is considered as a block, each auto tipper makes generally 3 trips a day. The average area covered by a ward is around 2 to 3 square kilometres
6. The operation starts from 6:30 AM to 12:30 PM / 01:00 PM. The 3rd trip is dedicated for collection of Street Sweeping Waste and garbage vulnerable points at their allotted ward from 12:30 AM to 2:00 PM. By 2 PM the ward is to be ensured that it is completely cleaned.

7. These auto tippers are outsourced by BBMP/BSWML. The private partner has to deploy auto tippers and compactors. Each package of single private players service scope encompasses door-to-door waste collection, segregation, collection, and transportation of segregated waste to the nearest transfer station / decentralized processing unit / end - processing unit (composting, dry waste collection centre, or authorized recycler). In the absence of a nearby decentralized plant or any other facilities, waste can be transferred to compactors and then sent to the nearest processing unit or dumping ground.

8. There are 225 wards in the city. Each ward has a different Private Player enraged by BBMP/BSWML. There are majorly 198 Private Players who are responsible for operating in all 225 wards for door step collection and transportation of waste from residential and commercial units. They are also responsible to clear the street sweeping collected heaps.

9. The Private Players engaged by BBMP/BSWML are paid on the invoices submitted by them after evaluation of their services delivered.

10. The Private Players do not collect any user charge from waste generators. Neither BBMP/BSWML has collected any user charge in the past.

11. Apart Self-Help Group's (SHGs) and Residential Welfare Association (RWAs) are also involved in door to door collection, segregation & decentralized composting in some of the areas.

12. They are mainly run by private players mostly under the name of NGO/ Sangha's/ societies/associations. There are approximately 180-250 such groups operating under different areas.

13. In the domain of collection and transportation, several categories of entities are involved in managing waste. For residential areas and apartments with less than 100 flats, the collection process encompasses residential premises and small shops during the first trip, while open points and street waste are addressed during the second trip. Shops and small commercial establishments also fall under the purview of the same contractors. Open points at the ward level are similarly managed by these contractors.

14. Bulk generators, consisting of facilities with more than 100 flats, are also managed by empaneled contractors.

15. Wet waste is collected on a daily basis, while dry waste is collected once in two days or thrice a week.

16. The terms and conditions with respect to service deliverance and expectation from the private players.

Figure 8: Wet & Dry waste Collection separately

2. Storage & Secondary Collection:

1. Bengaluru city is a bin less city and the bins/ Litter bins are placed only in the commercial areas. The SW collected from Door to Door is brought to a common point from where the waste is transferred to the Disposal sites through compactors & transfer stations.
2. The collected waste needs to go to the nearest dry waste / wet waste collection centre/ transfer station. If the waste is mixed and is in the refusal category by the dry waste/wet waste collection centre/nearest transfer station the same is being transferred to the auto tippers to refuse compactors engaged by the same private player. The refuse compactor transports the waste to the nearest large decentralised processing unit or to the landfill sites.
3. The refuse compactor is of minimum 14 cu m and maximum 18 cu m. Each Refuse compactor is manned by 1 Driver and 1 Helper
4. Solid waste is managed through the existing auto tippers, refuse compactors, dry waste collection centre, wet waste collection centre, transfer station and processing unit and landfill sites.
5. All the primary vehicles i.e. auto tipper will carry the waste from ward level to the transfer station or the refuse compactor stationed at specific locations for secondary collection and transportation of waste to the decentralized facilities or the landfill site.

Fig 9: Compactors for waste collection

6. Compactors typically undertake a minimum of 1 trip, covering an average of 50 kilometres (round trip), with some refuse compactors making up to two trips per day as needed.
7. There are about 4,600 three-wheeler/ auto tippers and 600 Refuse compactors are deployed for waste collection and transportation.
8. In residential areas or houses, wet waste is collected at the doorstep on a daily basis, while dry waste is collected twice a week using a dedicated vehicle or through door-to-door collection vehicles.
9. In slum areas, waste collection vehicles are stationed at a specific location, where waste generators hand over their waste directly to the vehicle, without the need for helpers using wheelbarrows or 60-liter bins. Resource deployment for this operation consists of one driver and one helper assigned to each auto tipper.

3. Dry Waste Collection Centres (DWCC)

Bengaluru has a unique waste storage and collection system. The Dry Waste which is generally collected every alternate day by the same auto tippers from households every alternate day is stored and collected at Dry Waste Collection Centres (DWCCs) constructed on Government land. Recycling of waste is also possible by setting up purchase / processing centres for dry waste, like plastics, paper, etc. About 119 Dry Waste Collection Centres (DWCC) have been established by BBMP. It is one of its kind and first time in a metro a DWCC concept is established. These DWCC called *Kartavya* – meaning duty that will remind the public of their duty towards recycling the waste they have created. This will be in their own neighbourhood and over a period of time the *Kartavya* centers will become part of the local community fabric

Fig10: -Dry Waste Collection Centers (DWCC's)

The aim of Dry Waste Collection Centers (DWCC's) is to keep as much waste out of the landfills/waste dumps as possible and to help make waste useful and profitable. DWCC's run by various agencies in Bengaluru in coordination with the BBMP is decentralized bulk sorting and processing facilities. About 185 DWCC's were planned and 114 nos. have been established and 106 nos. are functional currently. DWCCs are set up on municipal/government/private lands and various NGOs, waste pickers, and contractors; self-help groups have been involved for effective functioning. The dry waste generated in the wards is collected and further segregated and sent for recycling from these recycling centres. Receiving in bulk provides these informal sector workers with more significant returns and creates more jobs.

Dry waste materials like batteries, tin cans, plastic-coated milk cartons, nylon, cigarette butts, and leather all take varying lengths of time to degrade: not less than 10 years. Hence, the best way to dispose of these dry waste items is to reuse/recycle them. Nearly 55%-70% of all the dry waste thrown away can be safely disposed of this way

DWCCs is operated by various Agencies / NGO's in coordination with the BBMP is for bulk sorting and forwarding the Dry Waste to authorized recyclers.

Fig 11: Segregation at Dry Waste Collection Centers DWCC's

The DWCCs are categorized based on their size and capacity as follows:

(a) Small (Up to 1.0 Tons Per Day) – These have a floor area ranging from 80 to 100 square meters.
(b) Medium (1.0 to 2.5 Tons Per Day) – These occupy a floor area between 150 to 200 square meters.
(c) Large (More than 2.5 Tons Per Day) – These have a substantial floor area exceeding 300 square meters.

Prominently, BBMP has partnered with 2 to 3 non-governmental organizations (NGOs) to operate these DWCCs as part of their Corporate Social Responsibility (CSR) initiatives or Circular Economic programs, with organizations such as ITC and GAIL India participation.

The Dry Waste Collection Operators purchase waste materials from Waste Collectors, Rag Pickers, and Bulk Waste Collectors based on a daily price list.

The DWCCs are equipped with multi-story buildings, compound walls, gates, and essential facilities like generators, weighbridges, and specific partitions to support their operations. Also, there are 2 automatic segregation units/machines in a slum area of 10 TPH for segregation of dry waste and recovery of material. These are established by BBMP at a COST of Rs 3.5 crores each. These plants are operated and maintained by private players.

The Example of one of such facility (DWCC) can be seen in the table mentioned below:

Table 2: Dry Waste collection Centers

SL NO.	PARTICULARS	DETAILS
1	Location	Ejipura
2	Year of Commencement	2017
3	Operator	BBMP
4	Zones Covered	Ward no 147 and 148
5	Area of Plant	4,000 sqft approx.
6	Designed Capacity	2.5 TPD
7	Current Operating Capacity	1.5 TPD
8	Facilities Available	i. G + 1 Buildings with Compound Walls / Gate etc. ii. Diesel Generator iii. Small Scale Weighbridge iv. Specific Partitions.
9	No of workers for operating in the plant	6 to 8 Members (Approx.)
10	Supervision In charge	BBMP Ward Supervisor

11	Recyclable Sale rate	Different rates for different recyclable fractions which are decided by BBMP on a regular basis.

Fig12: Dry Waste Collection Centre (Waste Details Board)

The dry waste collection centres are approximately 4,000 sq. ft in area, with working space of about 10,000 sqft. At Ejipura Location This DWCC facility also serves as Waste Transfer points.

Note: The above existing Dry Waste Collection Centre is similar or for indication of all the other 119 DWCC established by the BBMP.

Although the DWCC's has been established to see that segregated dry waste goes for recycling and utilisation and contribute towards circular economy but in reality, more than 60 – 70% of collected dry waste goes to the Waste to Energy plant as RDF. DWCCs are set up on municipal / Government / private lands and various NGO's, have been roped in for effective functioning.

A separate MOU has been entered into by the BBMP with the operator. In addition, corporate companies are being encouraged to come forward to provide gap funding required under the EPR

(Extended Producer Responsibility) of such centres and also ensure that the recyclable material is sold through properly created channels to ensure that the recycled goods are not misused.

The DWCC also pays the Pourakarmikas /Public/Waste-picker or any individual who brings the waste to the centres as notified by BBMP from time to time. This encourages the public to segregate the waste at source. Also, a part of the dry waste centres is earmarked to store e- waste collected from the households.

4. Bulk Waste Generator Waste Collection & Transportation

In terms of waste management, Bulk Waste Generators, defined by BBMP as those producing over 100 kg/day or occupying more than 5,000 sq. m, a group of houses / flats of more than 100 Nos in a society. The city's estimated waste generation ranges between 1,000 to 1,200 Tons Per Day (TPD), and these generators are serviced by empanelled contractors responsible for collection under a user charge system.

Following are the major features of the existing solid waste collection system from Bulk Waste Generators in Bengaluru City.

1. The BBMP has notified Bulk Generators to segregate waste into different categories and manage their waste either in-situ or to utilize the services of BBMP Empanelled Service Providers.
2. A separate system has been put in place to collect waste from large waste producers like hotels, restaurants, marriage halls, markets, offices, etc. BWG waste collectors are collecting thse waste.
3. In this regard BBMP is facilitating the Bulk Generators with options of authorized service providers to engage for collection, transportation and processing of SW. SWM Service Provider Empanelment program aims to create a platform for solid waste service providers to enlist themselves. It will also ensure that Bulk Generators can meet the requirement of segregated waste processing in a responsible decentralized way.
4. Empanelment of service providers for various categories of SW has been taken up and the first list has been published empanelling 60 service providers. The empanelment process is continued.
5. The Bulk Waste Generators are directed to store the waste in their premises in a segregated manner.
6. All resources including manpower, equipment, bins, bags and vehicles by the empaneled agencies are engaged by them.
7. The waste is collected in larger vehicles which are mainly of tata 407 type or equivalent. The trips are based on the type of waste and commercialization of the area.
8. BBMP does not make any payment to the emplaned agencies. Neither BBMP collects any user charge from BWG or through the engaged agencies.

9. The emplaned agencies collect monthly service charges directly collected by the Bulk Waste Collectors.
10. Bulk Waste Generator - Commercial Units (Minimum: Rs 500 Per Month and Maximum – As per the Area of Premises).
11. Bulk Waste Generators – Residential / Flats / Villa (Rs 150 to Rs 200 Per Month).
12. The collected waste is transported to the processing unit/ dumping ground as deemed after taking away all the recoverable material and resources. The collected waste is transported directly to private recycling or processing units such as Material Recovery facilities or Biomethanation plants established by the Carbon Masters, MSGP Plant.

5. Sanitary Waste Management System

The Sanitary waste comes to around 1% of the total Generated SW i.e. 60 Tons Per Day (TPD) approx. As of now there is no such facility to handle and manage Sanitary waste in a scientific manner. However it is collected separately and processed through the bio-medical waste management agencies in four of the zones. Thus, through this project of establishing an ISWM Plant will have the Incineration Facility for these Sanitary waste. The Sanitary waste is collected from apartments, women's hostels and hospital wards.

6. Animal Carcass and Animal Waste

At present, the city generates around 50 Tons Per Day (TPD) in the normal days and 85 Tons Per Day (TPD) of Animal waste in the Peak days like festivals etc. As of now, there is only 1 plant of 4 TPD Capacity each to handle the animal carcass and the animal waste.

7. Transfer Station Management and Secondary Collection and Transportation

Transportation of waste from collection centres to the landfill site is another crucial step in waste management. At present, waste transportation is through auto tippers and in some cases through push carts to primary collection centres. From there, compactors collect the solid waste and transport it to the waste processing facility (Decentralized Wet waste management facility) and the disposal sites/dumping ground. In the first scenario, Auto Tippers deposit waste into the Refuse Compactors located at the Transfer Station or designated open points for loading. These operations are managed by Private Players.

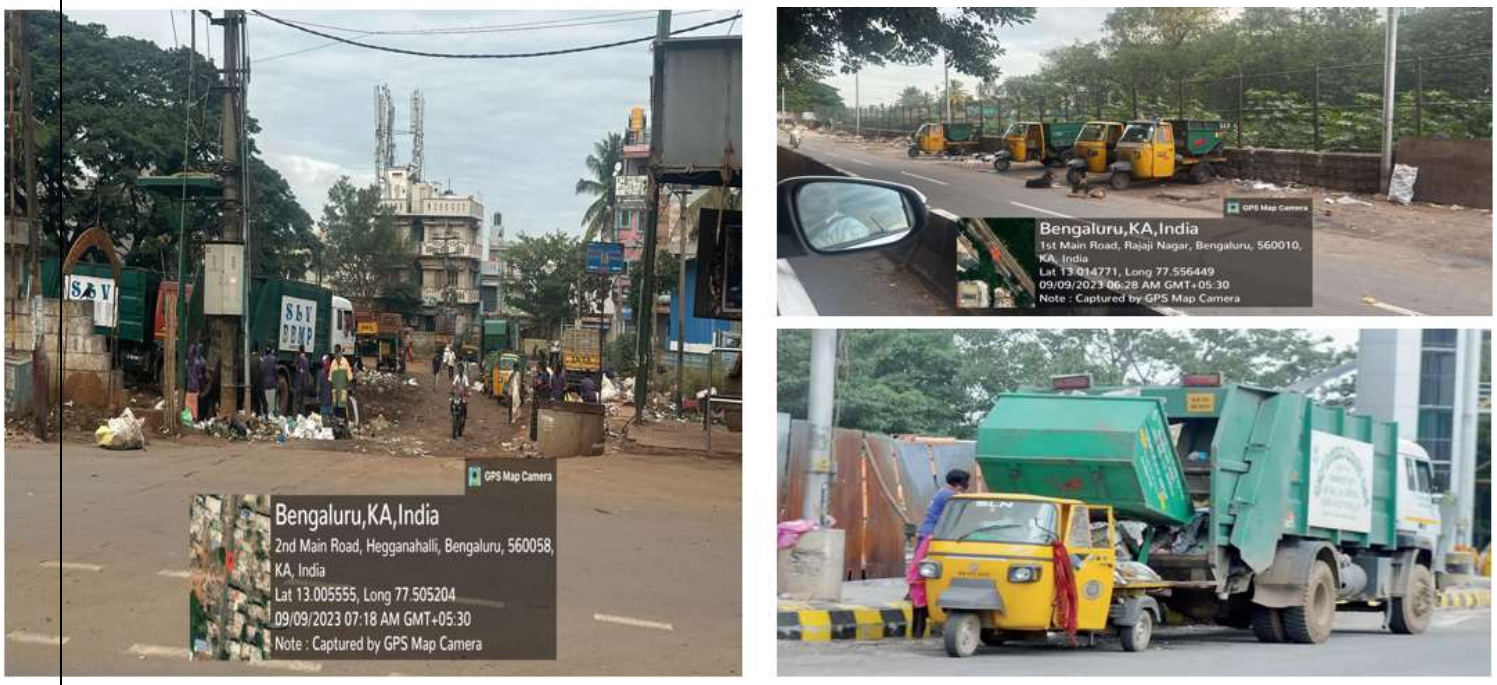

GPS Map Camera
Bengaluru,KA,India
2nd Main Road, Hegganahalli, Bengaluru, 560058, KA, India
Lat 13.005555, Long 77.505204
09/09/2023 07:18 AM GMT+05:30
Note : Captured by GPS Map Camera
GPS Map Camera
Bengaluru,KA,India
1st Main Road, Rajaji Nagar, Bengaluru, 560010, KA, India
Lat 13.014771, Long 77.556449
09/09/2023 06:28 AM GMT+05:30
Note : Captured by GPS Map Camera

Figure 13: Waste Collection Vehicles (Door to Door)

Figure 14: Weighbridge for Inward vehicle weighment and Vehicle parking

There are also mini transfer stations which act as waste collection centres. There are 24 mini transfer stations (25 Tons capacity each). These Mini Transfer Stations were constructed in 2020 and are managed by BBMP through an Engineering, Procurement, and Construction (EPC) and Operations & Maintenance (O&M) contract

Lastly, the transportation of waste to Decentralized Plants and the dumpsite is carried out by C&T Contractors, who were appointed by BBMP in 2019. And there approximately 580 to 600 nos. of 14 Cubic metres refuse compactors plying for Secondary Transportation from ward to designed decentralized plants or landfills or dumpsite covering a distance of 60 kilometres per day.

This entails one trip per day, covering a distance of 60 kilometres (to and fro) either to an existing processing plant or to the designated dumpsite.

Figure 15: Unloading waste from tipper to Heavy Compactor Vehicle

8. Road Sweeping

1. The sweeping is performed both manually & mechanically. In some of the highly commercial activity areas sweeping is done during night.
2. BSWML through BBMP undertake Street Sweeping. The street sweeping of the roads maintained by BBMP is mainly done by manual method.
3. Approximately BBMP has 13,000 Kms of roads of various types in the city of Bengaluru.
4. The street sweeping is done by Pourakarmikas of the Bruhat Bengaluru Mahanagara Palike. Nearly 18,500 Pourakarmikas are deployed for manual sweeping of the roads.
5. A few stretches of roads are also swept by Mechanical Road Sweeping Machines. They are used to sweep the Main Roads and bus routes of Bengaluru.
6. The swept material is collected in heaps in various wards. The collected heaps are transferred by Pourakarmikas / auto tippers to the nearest disposition centre. The disposition centre is generally the nearest auto tippers / waste collection centres. The Pourakarmikas and swept waste collection system is working in synchronisation to ensure that no vulnerable points and eye sore are created in the area.
7. BBMP (as per the GO UDD 126 TMS 2016 dated 7th August 2017), pays separately for the services of sweeping undertaken. This includes payment to Pourakarmikas and other associated infrastructure equipment.
8. There is no private player engaged in manual sweeping work undertaken by BBMP.

9. Existing Solid Waste Processing & Disposal System

Over a period of time in the last two-decade BBMP has practised a mix of centralised and decentralised processing and disposal of waste. The major focus has been resource recovery with more effort on decentralised processing of waste. BSWML through BBMP has set up a number of dry waste collection centres (119) and a number of wet processing units of various sizes (8 Facilities). The effort has been to see that waste does not get transported to larger distances and it gets treated in-situ.

While effort to treat the waste has been enormous the outcomes have not been to the level with increasing growth of the city and burgeoning problem of waste generation. This has led to no large scale of any appropriate scientific treatment techniques for waste generated by the corporation. This has led to the filling of the quarries and there by dumping of waste.

The solid waste, generated from hotels, restaurants, Kalyana mandapas, markets, etc., is being directly collected and transported to the various processing units / treatment/disposal facilities.

As on date Bengaluru has multiple waste processing units where waste is processed mostly through Composting and Bio-methanation Process.

Figure 16: Biomethanation Plant - 2

Figure 17: Biomethanation Plant - 1

To process wet waste, 5-ton capacity Bio-methanation plants are being established at 16 locations, out of which 4 have been made functional. The biogas generated from these plants is being utilized to light the street lights in that locality

9.1 Processing Plants (Decentralized Facility for Wet Waste)

Sl. No.	Name/location of the plant	Land area (in acres)	Design capacity in (TPD)	Existing capacity (wet waste)	Average waste processing	Ownership of the plant	Components available in plant
1	Chikkangamangala	25	500	350	245	BBMP	Compost
2	Doddabidarakallu	10	200	150	79	BBMP	
3	KCDC	10	500	350	150	BBMP	
4	Kanahalli	22	500	350	350	BBMP, Private (Sateram)	
5	Lingadheeranalli	10	500	120	60	BBMP	
6	Seegehalli	8	200	150	100	BBMP	

7	Subbarayanapalya	10	200	150	16	BBMP	
8	Koramangala	2	5+8(augmented from 5 to 8)	5+5	13	BBMP, PRIVATE	Biomethanation
Total			2263	1630	1013		
9	MSGP	75	-	750	700	Private MSGP	It is also processing waste of BWG's

Table 3: Processing Plants Centres

There are 8 Nos of Wet Waste / Processing facilities established by BBMP for 7 units through EPC contracts for about Rs. 450 crores and one by private (MSGP).

The projects were mainly designed for the treatment process of wet waste through anaerobic composting and bio methanation. As on date they are able to treat 1450 TPD of the waste. The untreated waste is transported to the dumping ground. BBMP has enraged their own staff or engaged through contract for the operation and maintenance of these plants.

One notable features of some of the processing and treatment plants is that plants lack infrastructure from treatment of leachate in most of the cases, thereby leading to the likelihood of leachate moving out of the plant premises without treatment.

Table 4: Existing Wet waste facilities

SL. NO.	NAME/LOCATION OF THE PLANT	LAND AREA (IN ACRES)	DESIGN CAPACITY IN TPD	EXISTING CAPACITY (WET WASTE)	AVERAGE WASTE RECEIPT	OWNERSHIP OF THE PLANT	COMPONENTS AVAILABLE IN PLANT
1	Kannahali	22	150	350	283	PRIVATE	compost
2	MSGP	75	-	750	700	PRIVATE	Compost, RDF, LTP and Sanitary landfill

A 10 TPD unit to convert the organic waste into biofuel through palletisation at Ward No 94, adjacent to Freedom Park, Gandhinagar, West zone by M/s CIPL Resurge Private Limited (CRPL) is commissioned from Dec 2014.

Figure 18: Wet Waste Process Facility

10. Existing Landfill Site

Open Disposal / Landfill site Management:

As on date there is one land where waste landfilling is happening, which is a quarry at Belahalli/Mittaganahalli. There are other landfill sites viz: one at Mavallipura which is under closure - 140 acres and the other at Mandur which is at 135 acres, and also at Bingipura.

Bengaluru grapples with landfill management challenges stemming from a surge in waste production and limited waste processing capacity, resulting in merely 30 to 35% of waste being effectively processed. The temporary closure of established landfills like Mandur and Mavallipura is attributed to environmental concerns.

Figure19 :Existing Dumping Ground

Approximately 3000 TPD is being dumped as on date. Last August 2023 onwards waste dumping has been 3200-3500 TPD approximately.

The Mittaganahalli landfill site is the active landfill site which is in an open quarry and is receiving most of the waste as on date. The Mittaganahalli landfill site is an open quarry with two parcels of land spread to the extent of 35 acres + 15 acres situated in the Yelahanka Zone, which receives 3,600 tons of mixed on a daily basis. The entire waste received at this dumpsite is not processed nor treated, but landfilled into the pits / open area. The open pits are lined with HDPE liners to avoid groundwater percolation. Once the quarries are filed BBMP intends to close the dump ground by scientific capping procedure to restrict the contamination of soil, water and air. But the notably absence of proper

leachate management and gas extraction systems, leading to detrimental consequences affecting nearby communities.

<table>
<tr><th>SL NO.</th><th>PARTICULARS</th><th>DETAILS</th></tr>
<tr><td>1</td><td>Location</td><td>Yelahanka</td></tr>
<tr><td>2</td><td>Coordinates</td><td>Latitude: 13.11022
Longitude:77.64992</td></tr>
<tr><td>3</td><td>Year of Commencement</td><td>2017</td></tr>
<tr><td>4</td><td>Operator</td><td>Land capping is done by Private Contractor (Sudarshan Raju)</td></tr>
<tr><td>5</td><td>Zones Covered</td><td>From all the parts of Bengaluru</td></tr>
<tr><td>6</td><td>Area of Site</td><td>54 acres</td></tr>
<tr><td>7</td><td>Used land</td><td>39 acres</td></tr>
<tr><td>8</td><td>Available land</td><td>15 acres</td></tr>
<tr><td>9</td><td>Existing Facilities</td><td>
<table>
<tr><th>NAME OF FACILITY</th><th>YES / NO</th><th>REMARKS</th></tr>
<tr><td>Compound wall</td><td>No</td><td></td></tr>
<tr><td>Security room</td><td>Yes</td><td>For 6 Marshals</td></tr>
<tr><td>Weighing Bridge</td><td>Yes</td><td></td></tr>
<tr><td>LTP</td><td>Yes</td><td></td></tr>
<tr><td>Workshop</td><td>No</td><td></td></tr>
<tr><td>Green belt</td><td>No</td><td></td></tr>
</table>
Note: Waste has been dumped in between 2 existing quarries.
</td></tr>
<tr><td>10</td><td>No of workers for operating the plant</td><td>No clarity</td></tr>
<tr><td>11</td><td>Supervision In charge</td><td>BBMP</td></tr>
<tr><td>12</td><td>Satellite Imagery</td><td>
</td></tr>
</table>

The present condition at Mittaganahalli landfill site is that phase # 1: Dumpsite is Covered with Clay (Capping process in progress) and phase # 2 : Liners Installed and Mixed Waste is dumped without any process. The site is having noncompliance in all other aspects. there are constant odors and methane gas is open to environment

Figure 20: Present condition at Mittaganahalli dumping ground

Figure 21: Present condition at Bingipura dumping ground

11. Summary of the above Existing Facilities:

The summary of the existing scenario within BBMP limits is as follows

The existing scenario:

1. Wards: 198
2. Population:1.32 cr. (excluding Floating Population)
3. Households (residential including slums and but excluding Bulk waste generators): 27,94,724
4. Commercial establishments other than bulk waste generators:3,07,774
5. Total Households: 31,02,498
6. Waste being transported in the existing mechanism
    a. Domestic: 4000 TPD

b. Small Commercial other than bulk waste Generators: 1530 TPD
c. Total: 5530 TPD

7. Total Auto Tippers with 750 Kgs to- 1000 Kgs for primary collection:

Auto tippers (1 per block; daily collection)	**Extra AUTO for markets / leaf litter / slum / high profile areas**	**Autos required (1 per 1750 units; bi-weekly collection)**	**Extra autos for commercial Night Collection (Non-Bulk Collection)**	**TOTAL**
4,900	41	596	4	5,000 TPD

8. Compactor

WET Waste Compactor (10 Tonnes)	**Reject + Mixed Waste Compactor (10 Tonnes)**	**TOTAL COMPACTORS (10 Tonnes)**
319	320	639

9. Existing processing quantities and its processing facilities

a. **Compost:** 2300TPD (designed) 1630 TPD (on an average)
b. **RDF segregation:** 119 DWCCs generating 120 TPD
c. **Bio Methanation:** 5 TPD capacity of 7 under upgradation and 4 of new plants of 5 TPD under execution stage
d. **WTE:** 600 TPD (RDF) incineration to generate electricity is in the final stage of the execution

10. Old Dumpsites and its capacities

S No.	Locations	Area	Status
1.	Mavallipura	138 acres	Closed
2.	Kannur	10 acres	Closed
3.	Mandur	135 acres	No Processing > No Landfill, WTE is under planning
4.	Bellahalli quarries		Closed
5.	Kannuru quarries		Closed

6.	Mittangahalli		Dumping Going on
7.	doddabidarakallu		Closed
8.	Subarayanpalya		Closed

11.Compost processing plants details

Sl. No.	Name/location of the plant	Land area (in acres)	Design capacity in (TPD)	Existing capacity (wet waste)	Average waste processing	Ownership of the plant	Components available in plant
1	Chikkangamangala	25	500	350	245	BBMP	Compost
2	Doddabidarakallu	10	200	150	79	BBMP	
3	KCDC	10	500	350	150	BBMP	
4	Kanahalli	22	150	350	350	BBMP, Private (Sateram)	
5	Lingadheeranalli	10	500	120	60	BBMP	
6	Seegehalli	8	200	150	100	BBMP	
7	Subbarayanapalya	10	200	150	16	BBMP	
8	Koramangala	2	5+8 (augmented from 5 to 8)	5+5	13	BBMP, PRIVATE	Biomethantion
Total			2263	1630	1013		
9	MSGP	75	-	750	700	Private MSsGP	It is also processing waste of BWG's

Table 6: Compost Processing plant details